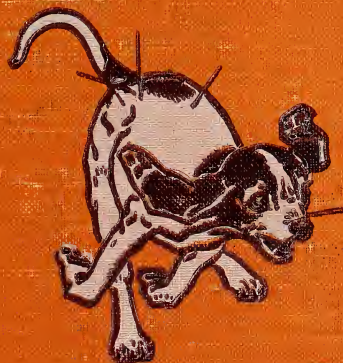


We Find Out

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NEW · PATHWAYS · IN · SCIENCE

We Find Out

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WITH ILLUSTRATIONS

BY ROBERT LAMBDIN AND REVERE WISTEHUFF

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New Pathways in Science

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We Want to Know

CRAIG • BURKE • BABCOCK

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We Find Out

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Changes All Around Us

CRAIG • BALDWIN

•

Our Earth and Sky

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The Earth and Life Upon It

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We Find Out

All Around Us



Things That Live

Animals

Mary's dog came to school. He came to find Mary.

He ran to Mary. He put his feet on her chair.

"Oh, here is my little black dog!" said Mary.

The children laughed to see a little dog in school.





"What a little dog!" said Peter.
"Will he get larger?"

"Yes," said Mary. "He will get a little larger, but Father says that he will not get very large."

"Some dogs are small," said Joe.



“My dog is large now,” said Peter.
“When I got him he was small. He
is getting larger and larger. Father
says that some day he will be a very
large dog.”



"I have a dog, too," said Joe.

"Is he like my dog?" asked Mary.

"No," said Joe. "He is larger than your dog."

"Is he like my dog?" asked Peter.

"No," said Joe. "He is smaller than your dog, and he is not getting any larger."



“There are many, many kinds of dogs,” said Miss White.

"May I bring my dog to school, Miss White?" asked Joe.

"Yes," said Miss White. "If you have an animal at home, you may bring it to school."

"May I bring my dog?" asked Mary.

"Yes," said Miss White. "You may all bring your animals."

"Then I will bring my dog," said Peter.

"I have no dog," said Alice.

"I did not say, 'Bring your dogs,'" said Miss White.

"I said, 'Bring your animals.' There are many kinds of animals. Dogs are animals, but they are not the only animals that children have."

"You have some animals at home, Alice," said Jack.



“Have I?” said Alice.

“Yes,” said Jack. “One day I went to your house. I saw your animals then. They live in water.”

“You are right,” said Alice. “My fish are animals.”

“Oh,” said Jean. “Then I have some animals, too. My fish are not like Alice’s. My fish are larger.”

“Father and I like to fish,” said Peter. “One day I got a very, very large fish. I wanted to keep it for a pet. Mother said it was much too large to keep at home.”



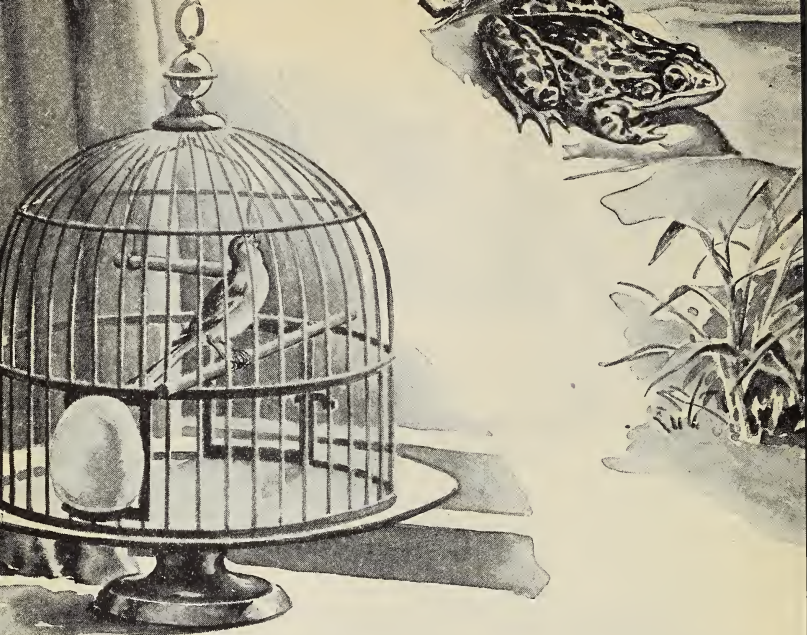


“Who has another animal at home?” asked Miss White.

Three children said at the same time, “I have a cat.”

Miss White and the children all laughed.

Then Miss White said: “Cats are animals, too. Bring the three cats to school on the same day. We shall see that cats do not all look the same.”



“Are birds animals?” asked Mary.

“Yes,” said Miss White. “Birds are animals.”

“Then I have an animal at home,” said Mary. “I have a bird. I will not bring my bird on the same day the cats come to school. Most cats eat birds.”



“I have no animals to bring,” said Tom. “But I can take you to see some that live near my house.”

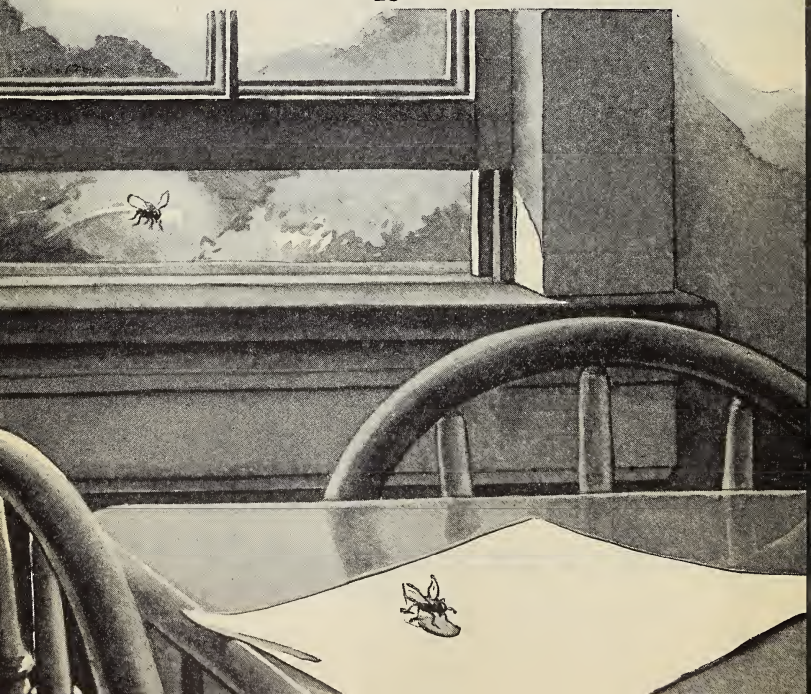
“Good,” said Miss White. “We will go to see your animals.”

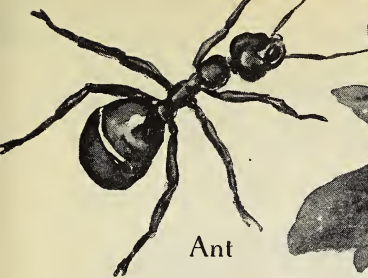
"There are many kinds of animals that live around here," said Miss White. "I see one now on the table."

"I see it," said Mary. "It is a fly."

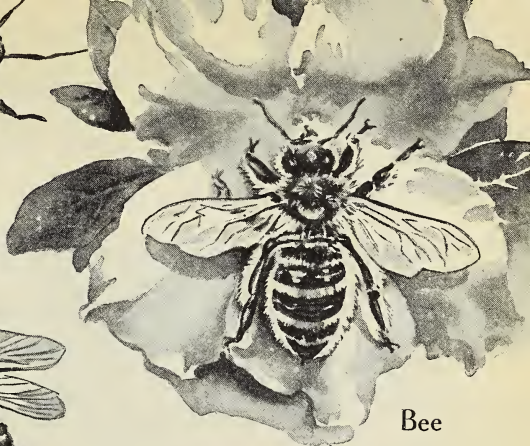
"But Father says that a fly is an insect," said Jack.

"Your father is right, Jack," said Miss White. "Flies are insects, and insects are animals."

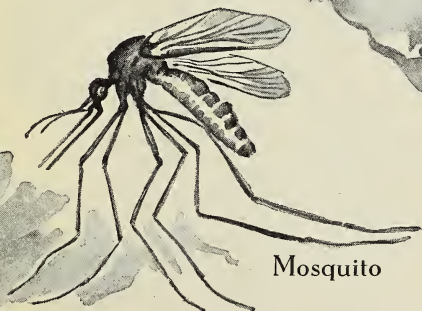




Ant



Bee



Mosquito

"Ants are insects, too," said Jack.
"I have seen many of them. There are many, many kinds of ants.

"Some of them are large and black.

"Some of them are red and small."

"Are ants the smallest animals?" asked Alice.

"Oh, no," said Miss White. "Ants are not the smallest animals."

"An elephant is the largest animal that I have seen," said Tom.

"The smallest animal that I have seen is a little green insect."

"There are many, many kinds of animals," said Jack.

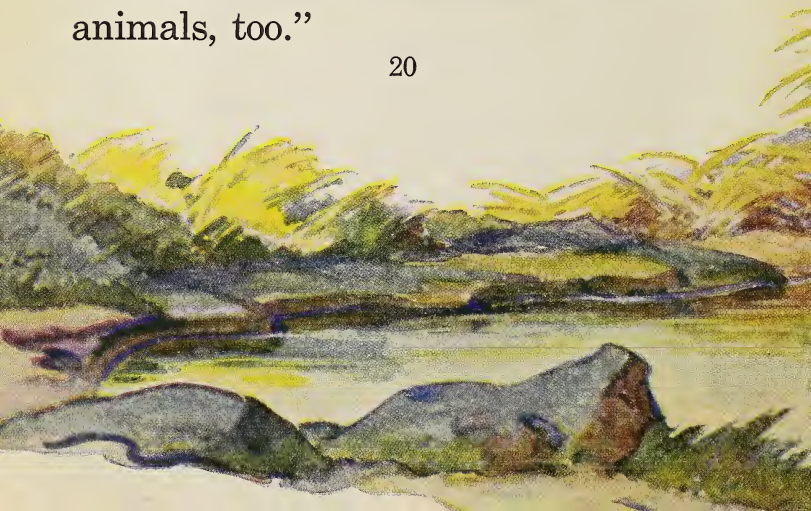
"Some are large like an elephant, and some are small like an insect.

"Some have four feet like a dog.

"Some have two feet like a bird."

"We have two feet, too," said Mary.
"Are we animals ? "

"Yes," said Miss White. "We are animals, too."





THINGS TO DO

Make an animal book. Put these things into it :

1. Names of animals you see on the way to school.
2. Names of animals you see in the woods or in a park.
3. Pictures of animals you see on a farm.
4. Pictures of animals that have two feet.
5. Pictures of animals that have four feet.
6. Pictures of dogs that do not look the same.
7. Pictures of cats that do not look the same.



Plants

"Let us talk about animals again," said Jack. "I like to talk about them. They are alive."

"But many things are alive that are not animals," said Miss White.

"What are they?" asked Joe.

"I see something in this room. It is alive, but it is not an animal. Look around and see if you can find it," said Miss White.

“Alive, but not an animal,” said the children.

They looked around the room.

Then Alice said : “ I see it. It is the plant on the table.”

“ Yes,” said Miss White. “ It is the plant. Plants are alive, but they are not animals.”

“ I see another plant when I look out of the window,” said Jack.

“ Is it that tree ? ” asked Alice.

“ Yes, it is,” said Jack. “ A tree is a plant.”

“ Oh,” said Mary. “ I did not know that a plant could be so big.”

“ Some trees grow much larger than the one in our school yard,” said Jack.

“ Go to the window, Mary,” said Miss White. “ How many kinds of plants can you see ? ”



Mary went to the window.

“ Oh, I see many, many kinds of plants,” she said.

“ What is the smallest plant you see ? ” asked Tom.

“ The smallest plant I see is grass,” said Mary. “ I think there are plants that are smaller than grass, but I can’t see them from the window.”

"I know that grass is alive," said Tom. "Our grass grows and grows, and I have to cut it. Then I give the grass to our cow. Cows eat grass."

"Many animals eat plants," said Mary.

"People are animals, and people eat some plants, too," said Miss White.

"We could not live if there were no plants. We eat plants every day.

"Go to the window, Jack. Look for a plant that we eat."

"I shall look in our school garden for plants that we eat," said Jack.

Here are some of the plants that Jack saw in the garden.



THINGS TO DO

1. Put pieces of plants in water or in sand.

You will soon have new plants for your school.

2. Make a plant book. Put into it :

Names or pictures of all the plants you know.

Names or pictures of all the plants that people eat.

Names or pictures of all the plants that grow in your garden or in the park.

Pictures of many kinds of trees.

Things That Do Not Live

Wind and Water

One day Mary said to Miss White, "Are there some things that are not alive and were never alive?"

"Look around you and see if you can find out," said Miss White. "I will tell you if you are right."

All the children went to the window to help Mary. They looked and looked for something that was not alive.

Then Tom said: "I see something. The ground is not alive."

"That is right, Tom," said Miss White. "The ground is not alive."

"Oh," said Mary, "I see something. The rocks in the rock garden are not alive. They do not grow, and they do not move."



“That is right,” said Miss White.
“Rocks are not alive. But some things move that are not alive.”

The children looked and looked.

“Can we see one from here?” Tom asked.

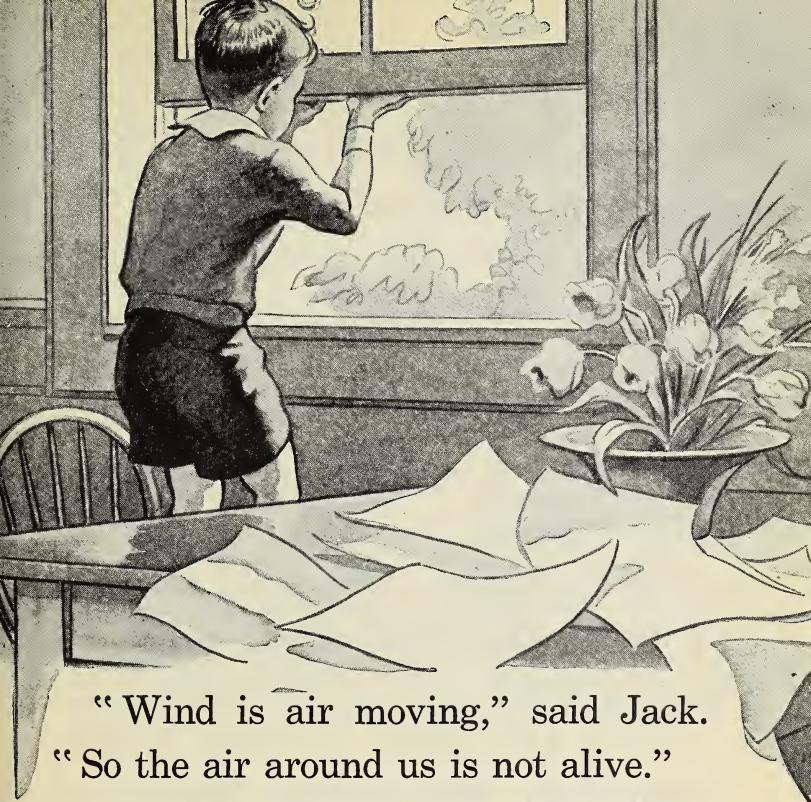
“No,” said Miss White. “You can’t see it, but you can see what it does when it moves. Put up the window. That may help you.”

When Tom put up the window, all the things on the table blew about. The children ran after them.

Miss White laughed to see them.

“Something that is not alive is in this room now,” she said. “We can not see it, but we can see what it does.”

“The wind!” said all the children.
“Wind is not alive, but it came in and blew things around.”



"Wind is air moving," said Jack.
"So the air around us is not alive."

"Air is not alive," said Miss White,
"but it helps us to live. All animals
and plants must have air."

"I can think of another thing that
helps us to live. We use it every day,
and it is not alive."

“ Can it move ? ” asked Tom.

“ Yes,” said Miss White, “ and it can move other things, too.”

“ Can we see it ? ” asked Jack.

“ Yes,” said Miss White, “ there is some of it in this room.”

“ Is it moving ? ” asked Mary.

“ No, it is not moving now,” said Miss White.

The children looked at all the things in the room. They looked for a long time.

Then Alice said : “ I think I know what it is. It is water. Water can move, and it can move other things. It is not alive.”

“ There is water in the flower bowl,” said Jack. “ Is water right ? ”

“ Yes,” said Miss White, “ that is right.”



“Water helps people and plants to live,” said Tom. “We drink water, and we wash in water. There are many other ways that water helps us to live.”

“Yes,” said Miss White, “water is not alive, but it helps to keep plants and animals alive.”

Rocks and Stones

It was time for the children to go home. Miss White put on the board:

Something to Do

Look for things that are not alive.

The next day most of the children came to school with something that they had found.

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“Most of your things are rocks of some kind,” said Miss White. “There are many kinds of rocks. No two of your rocks are the same.”

“Here is something that is not a rock,” said Mary. “This is a nail.”

“That is my nail,” said Joe. “It is not alive and never was alive. Father says it is made of iron. We dig iron from the ground, and it is not alive.”



“ See what I found on the ground,” said Jack. “ I think we should put it with the things that are not alive.”

“ Oh, that is glass ! ” said Tom.

“ What is glass made of, Miss White ? ” asked Joe. “ If we can find that out, we shall know if this piece of blue glass is alive.”

“ I could tell you,” said Miss White. “ But I want to see if you can find out if I do not help you.”

“ I know how to find out,” said Tom. “ May I get a book about glass ? ”

“ Yes, you may,” said Miss White. “ We will talk about these rocks.”

The children had found many kinds of rocks. Some were large, and some were small. Some were round, and some were not. Some were smooth, and some were not.



"We can find out much more about these rocks if we wash them," said Miss White.

Jack got a large bowl of water. The children washed the rocks one by one.

"Look at my rock!" said Mary. "Look at my rock! See how pretty it is! It has pretty colors in it. I did not know that rocks had colors."



“In some places people find stones that they like very much. They like them so much that they put them into rings. See, I have one in my ring,” said Miss White.

“It is very pretty,” said Mary.

“The stone in my ring was cut from a large rock,” said Miss White.

“My mother has a diamond in her ring,” said Mary.

"I like diamonds," said Jean.

Jack held up one of the rocks that he had washed.

"Here is a pretty rock," he said. "It has little places in it that shine like diamonds. Are they diamonds?"

"No," said Miss White. "There is something in that rock that we call mica. It is mica that makes some rocks shine."

"I found out something about this rock," said Mary. "I let go of it. It went down hard on another rock, and little pieces came off. It is not hard like some rocks."

"Some rocks are not so hard as others," said Miss White.

"Here comes Tom," said Jack. "Did you find a book that tells about glass, Tom?"

“Yes,” said Tom. “Will you read it, please, Miss White?”

Miss White read, “Sand is used in making glass.”

“Sand isn’t alive,” said Jean.

“Then the piece of glass is not alive and never was alive,” said Peter.

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“Iron is not alive. All these many kinds of stones are not alive,” said Tom. “I am going to look for more things that are not alive.”

THINGS TO DO

1. When you go to other places, look for rocks and stones.

Are they like the ones around your home ?

2. When you are taking a walk after a rain, see how the wind and the water have moved things.

3. See if you can find some stones with mica in them.

4. Make a book. Put into it :

Pictures of what wind does.

Pictures of what water does.

Pictures of ways people use rocks and stones.

Animal Homes



Animal Homes At School

The Aquarium

One morning the children found a surprise at school.

"It looks like a glass box," said Mary.

"I know what it is for," said Jack.
"It is for fish."

"Yes," said Miss White, "it is for fish. We call it an aquarium."

"Where are the fish?" asked Jack.



“ In the pet store,” said Miss White.
“ We will get them when the aquarium is ready. Who will help ? ”

“ I will, I will, I will ! ” said all the children.

Alice washed the aquarium.

Jean put sand into a large bowl of water. Then she made her hands go round and round in the sand.

That washed it. Then she put the clean sand into the clean aquarium.

“ What is the sand for ? ” asked Mary.

“ We are going to put some plants into the aquarium,” said Tom. “ We must have sand to keep them down.”

“ The plants are good for the fish,” said Miss White. “ They help the fish to breathe. Now, Tom, you may put water into the aquarium.”

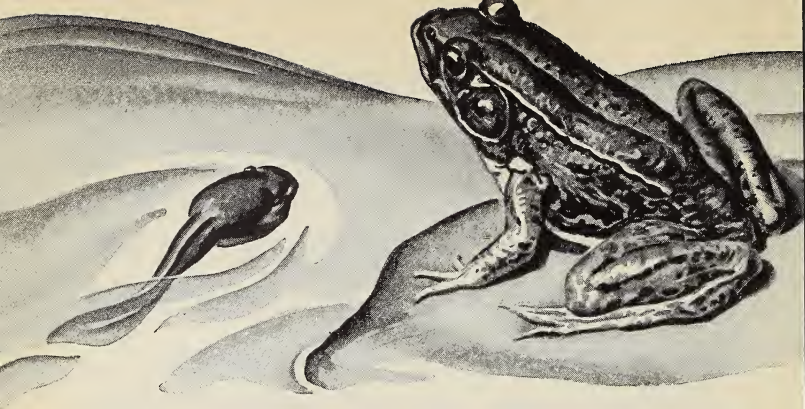
When the water was all in, Jack said, "Now the aquarium is ready for the fish."

Miss White put her hand into the water. "The water is too cold for fish," she said.

"Shall we put in some warm water?" asked Jack.

"No," said Miss White. "The air in the room is warm. It will warm the water. We shall buy the fish in the morning. By that time the water will be as warm as the air. Then it will be ready for the fish."





“May we buy some tadpoles at the pet store?” asked Jack. “I had a tadpole at home. My tadpole grew into a frog.”

“Yes,” said Miss White. “Tadpoles will be good for our aquarium. They help to keep it clean.”

“Then we can see them grow,” said Mary. “What fun if our tadpoles grew into frogs!”

“We shall have many things in our aquarium,” said Alice. “Fish and plants and tadpoles.”



“There is another animal that will be good for the aquarium,” said Miss White.

“I know,” said Jack. “A snail! We had some once at home. It is fun to watch them. They will keep the aquarium clean, too.”

“How do snails keep the aquarium clean?” asked Mary.

“A snail eats the little water plants that grow on the glass. That keeps the glass clean. Water plants make good food for the little snails,” said Miss White.

At the Pet Store

The next morning Miss White and the children went to the pet store.

"Good morning, Mr. Smith," said the children.

"Good morning, children," said Mr. Smith. "I am very glad to see you. What can I do for you this morning?"

"We have an aquarium at school," said Mary. "We want to buy some animals for it."

"What animals do you want?" asked Mr. Smith. "And how many?"

The children looked at Miss White. She said, "We have room in our aquarium for two tadpoles, three fish, and three snails."

"Then we want three fish," said Mary.

"We want two tadpoles," said Alice.

"We want three snails," said Tom.

"We want some plants too," said Jack.

"Did you bring something to put the fish in?" asked Mr. Smith.

"Yes," said Tom, "here is a pail."

"I see that you know that fish must live in water," said Mr. Smith. "And you know that you must never take them in your hands."



"I don't see how fish live in water," said Mary. "All animals must have air, and a fish is an animal. How does it get air? Does it put its nose out of water to breathe?"

"You did some good thinking when you asked that," said Mr. Smith.

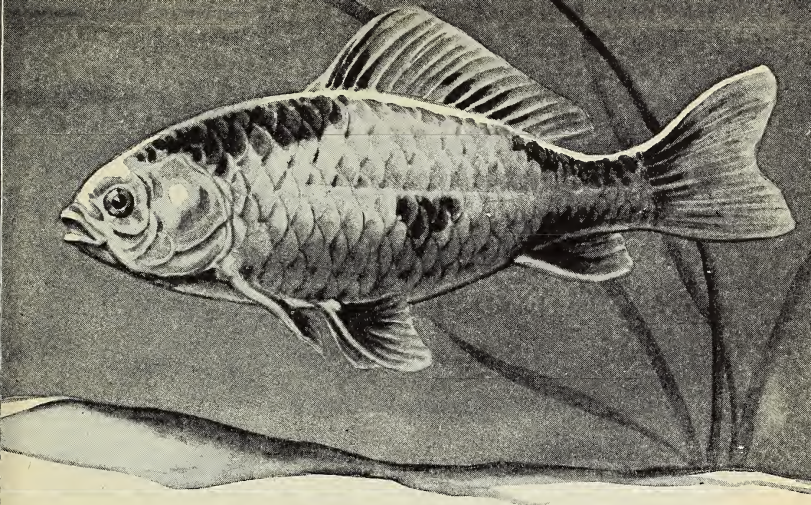
"I will tell you. Did you know that there is air in water?"

"Oh," said the children.

"Yes," said Mr. Smith. "There is air in water, and a fish gets air from the water."

"But," said Jack, "if a fish can get air from water, why can't I? When I swim I have to keep my nose out of water. I can't breathe under water."

"You are thinking, too," said Mr. Smith. "I can tell you why you can't breathe in water."



“You don’t breathe the way a fish does. You have lungs, and you breathe with your lungs.

“A fish has gills. It breathes with its gills. A fish can breathe the air in water, but it can’t breathe in the air. Do you know why?”

“It does not have lungs,” said Jack.

“Yes, you are right,” said Mr. Smith. “That is why a fish can’t live out of water.”

Mr. Smith put water into the pail. He put three fish into the water. He put in two tadpoles and three snails.

"Snails and tadpoles have gills, too," said Mr. Smith. "That is why they can live in water."

He put water on a piece of paper. He put the paper around the plants and put them into a box.

"Good-by, Mr. Smith," said the boys and girls.

"Good-by, children, good-by," he said. "Come again."

The children and Miss White went back to school. They put the plants into the sand in the aquarium.

"Now the plants can grow in the sand," said Alice.

They put all the animals into the aquarium.



“See the fish swim!” said Alice.
“I like to watch them.”

“The tadpoles do not swim in the same way,” said Tom. “They look funny when they swim.”

“The snail is going up the side of the aquarium,” said Mary. “He does not swim.”

“Animals move in many ways,” said Miss White.

THINGS TO DO

1. There is air in water. Put some water into a glass pan. Heat the water.

Can you find where the air is ?

Where does the air go ?

2. Think about this :

If all the air went out of the water in this way, could fish live in the water ?

Could you put this water into your aquarium ?



A Home for Ants

One day Miss White said, "Do you want to make another animal home?"

"Oh, yes," said the children.

"We have a water home," said Miss White. "Let us make a home for an animal that lives in the ground. I am thinking of a very small animal."

"Are you thinking of an ant?" asked Peter.

"Yes," said Miss White, "that is it."

"It will be fun to make a home for ants," said Jack.

"I know where to find some ants," said Jean. "There is an ant hill in the school yard. I saw many ants there one day."

"I know where the ant hill is, too," said Tom. "I like to watch the ants going in and out. They bring out sand and put it on the ant hill."

"Let's go out now and find it," said Miss White.

"Mary, you may take this glass jar. Tom, you may bring the spade."

Jean and Tom were right. There was an ant hill in the yard. The ants were going in and out of the hill.

"Now, Tom," said Miss White, "take some soil from the ant hill. Put it into the jar."

"See all the ants!" said Mary.
"The soil is full of them."

Tom put the soil into the glass jar. He put the ants in, too. The jar was full of ants and soil.

"There is no top on the jar," said Jack. "The ants will get out of it."

"When we get back to school you will see how we can keep them in," said Miss White.

Mary took the glass jar with the ants and the soil back to school.

"Now," said Miss White, "we must get a pan of water."

"What is that for?" asked Tom.

"To keep the ants in the jar," said Miss White.



“How will water keep the ants in the jar?” asked Jack.

“Ants can’t live in water, and they can’t swim,” said Miss White. “We shall put the jar of ants in the water. That will keep them in the jar.”

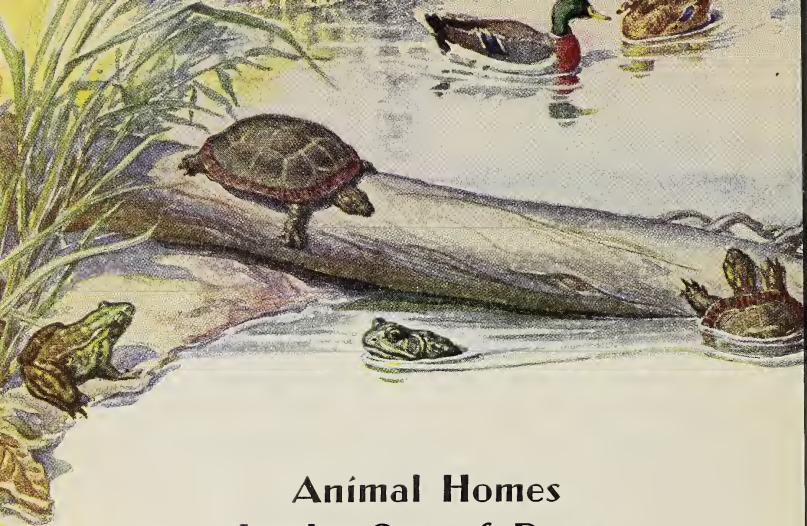
Before long the ants were hard at work. They were making an ant hill in the jar.



“ We must give the ants some food,”
said Miss White.

The children gave them small pieces
of bread. The ants took the food into
their holes.

“ The ants have a good home here,”
said Miss White. “ They have soil and
water and food and air.”



Animal Homes In the Out of Doors

Water Homes

One morning Tom and Jack were watching the animals in the aquarium. The fish were swimming round and round.

"I like to watch the fish swimming about," said Tom.

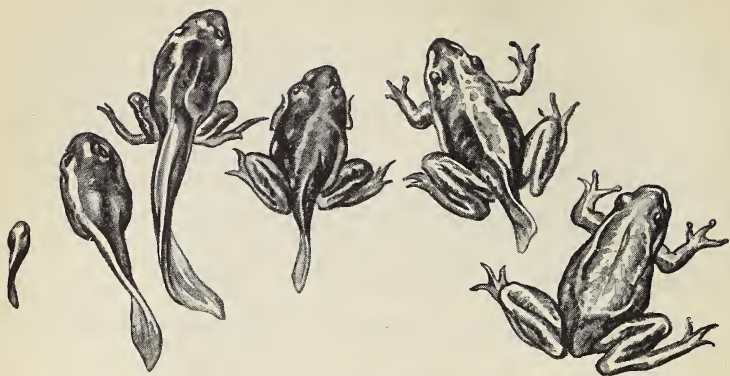
"See the snail," said Jack. "It is going up the glass of the aquarium. It can't go very fast."

The tadpoles were on the sand at the bottom of the aquarium.

"See the large tadpole," said Tom. "He is swimming now. He is funny when he swims. Oh, oh, come here, Miss White! Come here, Mary."

"Look at that tadpole! He is getting some legs. He will be a frog soon!"





"I see his legs," said Mary. "He has two legs. There is a little leg on each side of him."

"Let's watch him all day," said Jack. "Then we can see his legs grow."

Miss White laughed. "You will have to watch much longer than a day," she said. "It takes a long time for a tadpole to grow into a frog."

"Is a long time many, many years?" asked Jack. "I do not want to watch many years for him to grow."

“No, it will not take so long for him to grow into a frog,” said Miss White. “It will take only two or three weeks. This tadpole had been in the water for about a year before we got him.

“Some tadpoles grow into frogs in three weeks.

“Other tadpoles take about a year to grow up.”

“I am glad that we shall not have to watch him for a year,” said Tom. “A year is a long time.”

“When he has turned into a frog we must make the aquarium into a good home for him,” said Miss White.

“Isn’t the aquarium a good home for him now?” asked Jack.

“It is a good home for a tadpole,” said Miss White. “A tadpole has gills and can breathe in water.

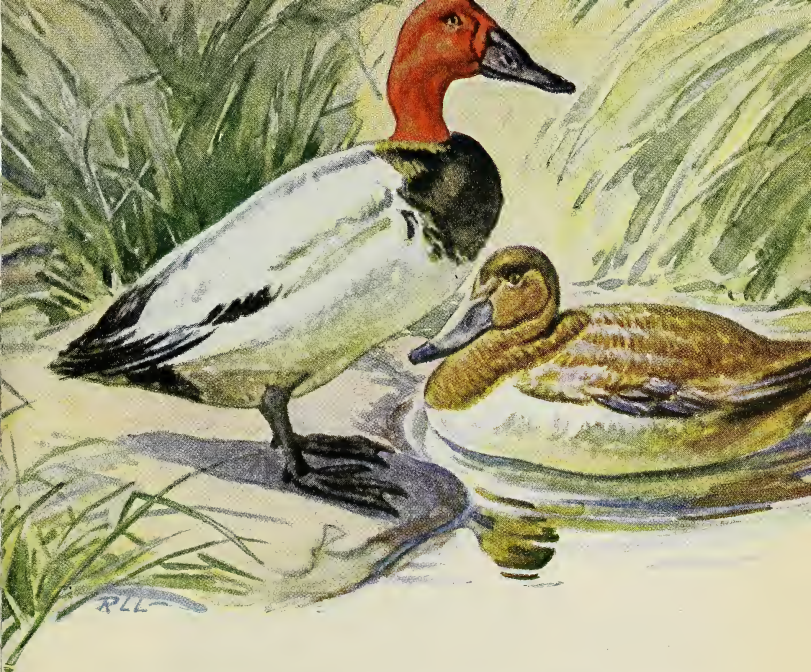
"A frog has lungs. It has to put its head out of the water to breathe. An aquarium is a good place for a tadpole to live, but not so good for a frog."

"When he is a frog we can put a big stone in the aquarium," said Jack. "Then he can come out of the water and sit on the stone."

"Will the aquarium be a good home for him then?" asked Tom.

"Yes," said Miss White. "Frogs live both in water and on land."

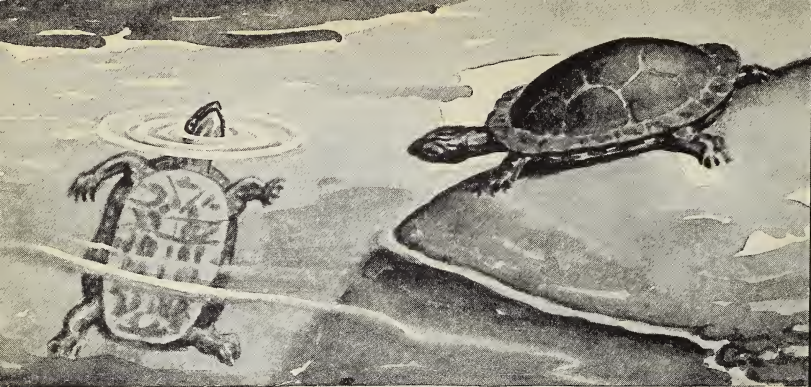




“I know another animal that lives in water and on land,” said Jack.

“What animal is it?” asked Miss White.

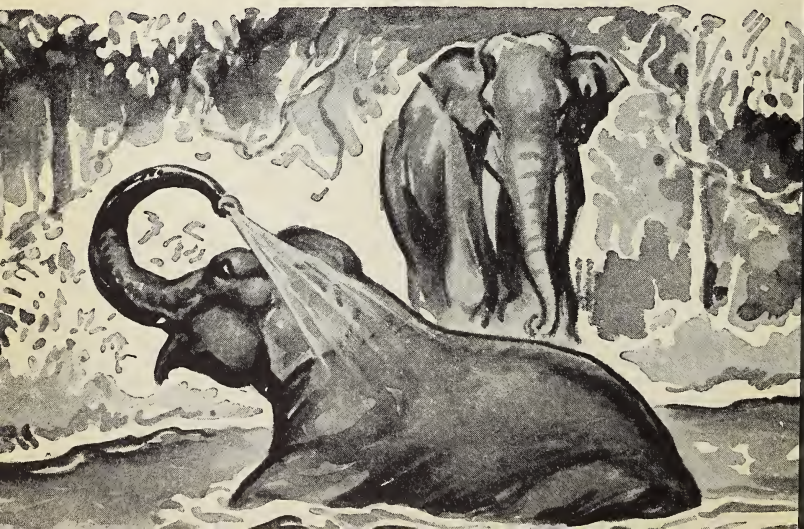
“A duck,” said Jack. “Once I saw a duck’s nest. It was in the grass near a lake. The ducks could swim in the water. Their feet help them to swim.”



"Turtles live in the water and on the land too," said Tom.

"An elephant lives on the land, but he likes to play in the water," said Jack.

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“These animals live on land, and they live in the water too.”



“Some animals can’t live on the land.”



“Some animals can’t live in the water.”



“Some animals live both in water and on land. When our tadpole grows into a frog,” said Miss White, “we must see that he has both land and water.”

Animal Homes in the Ground

One day Miss White and the children were talking about the ants and their home in the ground.

“Do many other animals live in the ground?” asked Jean.

“Yes, many other animals,” said Miss White.

“Let us make a book about them,” said Jack. “Let’s look for pictures of animals that live in the ground.”

“Let’s put something about each animal under the picture,” said Miss White.

“Then we can make a good book about animals that live in the ground,” said Mary.

Here are some of the pictures and stories that the children put in their books.



A woodchuck

"A woodchuck makes his home in the ground. He can dig very fast. He comes out to look for food. The woodchuck eats plants."

A chipmunk

"A chipmunk lives in the ground. He digs his home, too. He comes out to look for food, too. In summer the chipmunk takes food to his hole. He keeps it there to eat in the winter."





An earthworm

“An earthworm lives in the ground. After a rain he comes out of his hole. The hole has too much water in it then.”

A mole

“A mole lives in the ground. He eats worms and insects that he finds in the ground. The mole does not need to come out of the ground for his food.”



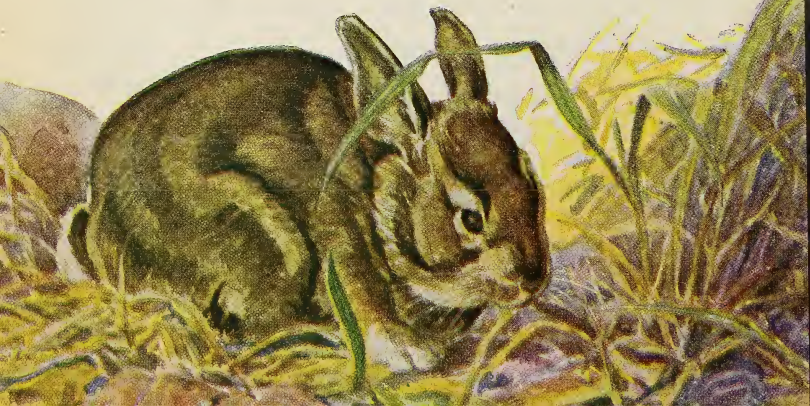


A snake

“Many snakes live in holes in the ground under big rocks. Snakes do not make their holes. They find the holes to live in.”

A rabbit

“Some rabbits live in holes in the ground, too. They eat plants for food. A rabbit can hop very fast.”



Homes above the Ground

The children had fun making the book about animals that live in the ground. They made another animal book. It was called

ANIMAL HOMES ABOVE THE GROUND

Here are some of the pictures and stories about these animals :

Birds

“ Birds live above the ground. They fly about in the air. Most birds make their nests above the ground. Most birds are wild.”





Cats

“Cats live above the ground. Some cats live with us. We have them for pets.

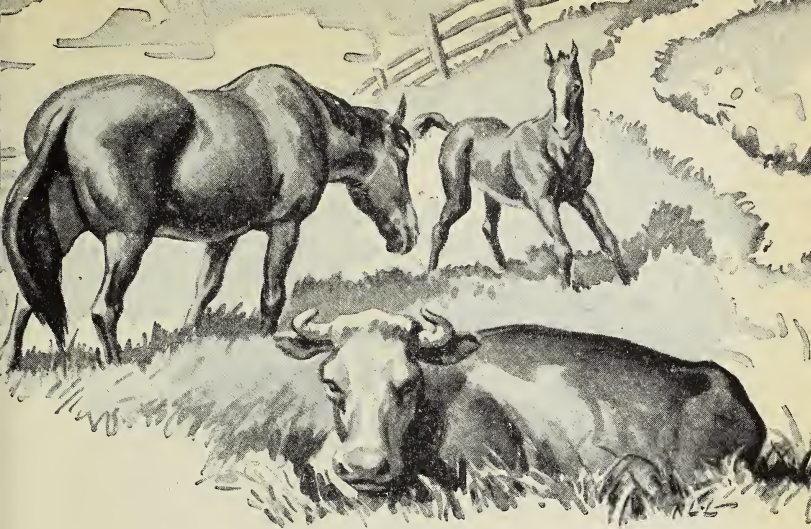
“Some cats are wild. They make their homes in the woods. Sometimes they find a hole under some big rocks for a home. Sometimes they find a hole in a big tree.”

Dogs

“We have dogs for pets, too. We make houses for them, or they live with us. Some dogs are wild.”

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Horses and Cows

“Horses and cows live above the ground. They live with people. At one time horses and cows did not live with people. They were wild.”

SOMETHING TO DO

When you take a walk in the park or in the woods, look for animal homes. If you find an animal making a home, sit very still and watch.

III

Δίρ





Fíre Needs Aír

It was Halloween. Jack and Tom had made a jack-o'-lantern.

"It is getting dark. Father will come home soon," said Jack.

"Let's call Mother to light the jack-o'-lantern," said Tom. "Then we will surprise Father."

“That will be fun,” said Jack. “We will hide behind the big chair. Then Father will not know that we are here. He will see just the jack-o’-lantern. Then he will be afraid.”

Tom put the jack-o’-lantern on the table. Jack called Mother.

She came in to light the jack-o’-lantern. The jack-o’-lantern laughed at them.

“See how funny it looks !” said Tom.

“Now let’s hide,” said Jack.

They went behind the big chair. They were very still for a long time.

All at once the light in the jack-o’-lantern went out. That made the room very dark.

“Did you put it out ?” asked Jack.

“No,” said Tom. “It must have been the wind.”



“I will put down the window,” said Jack. “Then I will ask Mother to light the candle again.”

Mother came in to light the candle again. Once more the jack-o'-lantern laughed.

"Now let's hide again," said Tom.

They went behind the chair again. They did not move for a long time. Father did not come.

What do you think happened? The light grew smaller and smaller. Then the candle went out again. It was very still in the room.

"There must be a Halloween goblin in this room," said Jack.

"I am afraid," said Tom.

"So am I," said Jack.

The boys ran out of the room. Then they saw Father. He had just come home.

"What is all this?" asked Father.

"A goblin! A Halloween goblin!" said the boys.

"A goblin?" said Father in surprise.

"But there are no goblins."

"Something puts out the light in our jack-o'-lantern," said Tom.

"Well, well," said Father. "It must have been the wind."

"No, it can't be the wind," said Tom. "Jack shut the window to keep out the wind. And the light went out again."

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“ Well, well,” said Father again. “ Let us go back into the room and find out why the light went out. There must be a reason for it. There is a reason for things that happen.”

As soon as Father saw the jack-o'-lantern he said, “ I know why the light went out.”

“ The wind did not put it out,” said Jack.

“ Is the candle too long ? Is it too near the top of the jack-o'-lantern ? ” asked Jack.

“ No,” said Father, “ that is not the reason. I will tell you something that may help you to find the reason. Fire must have air.”

“ But air can get into the jack-o'-lantern,” said Jack. “ The holes for the eyes and nose let in air.”



“ Yes, the eyes and nose and mouth let in air,” said Father. “ But they let in too little fresh air. They are too small. Do you want to find out if I am right about it ? ”

“ Yes,” said Jack, “ and I know how to find out. We can make the eyes and nose and mouth larger. That will let the air in faster.”



"Then if the light does not go out," said Tom, "we shall know that Father is right. There will be enough fresh air in the jack-o'-lantern to keep the candle burning."

"There is a better way to let in fresh air," said Father. "We can make an air hole in the top of the jack-o'-lantern. Then much more air can get in to keep the candle burning."

"Let us do it," said the boys.

Father and the boys made the hole.

Then Father said, "Now I will light the candle again."

This time the candle did not go out.

"Father was right," said Tom. "Now there is enough fresh air going in to keep the candle burning."

"Now we can have some fun," said Jack.

"That is good," said Father. "After this always look for the reason why something happens. Then you will not be afraid."



THINGS TO DO

1. Light a candle. Put a glass jar over it. What happens? Do you know why?

2. Light a candle. Put a small glass jar over it. Light another candle. Put a large glass jar over it.

Which candle goes out first?

Can you tell why?

SOMETHING TO THINK ABOUT

These people are going home. They must put out the fire.

How do you think they will put it out?

86





Air Pushes

One day the wind was blowing very hard. Tom and Jack looked out of the window. They saw many things fly by.

"There goes a hat," said Tom.

"It is Mr. Smith's hat. See him go after it," said Jack. "He will never get it. He can't run fast enough."

"Here comes another man," said Tom. "Look at him! He has his head down and is pushing against the wind."

"Oh," said Jack. "It is Father!"

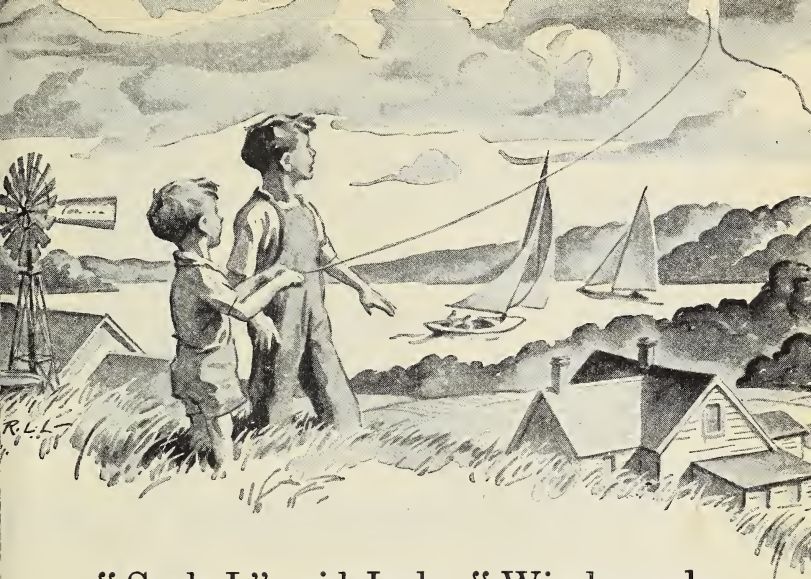
"I did not know him," said Tom. "He looked so funny with his head down pushing against the wind. He is coming to the door now."

Mother and Jack and Tom went to the door. Father came in, and with him came wind. It blew things about. Tom and Jack ran to help Father to shut the door.

"It must have been hard to walk with the wind pushing against you," said Mother.

"Yes, it was," said Father. "The wind is blowing very hard today."

"I like the wind," said Tom.



"So do I," said Jack. "Wind can do so many things. It makes many things move."

"Wind pushes against things and makes them go, but when air is still it does not push," said Tom.

"Oh, yes, it does," said Father. "Still air does not make things move, but it pushes all the time. It pushes on all things."

"Oh!" said the boys.

“Get me two pieces of paper,” said Father. “I will show you that air pushes against things.”

Tom ran for some paper.

“Here is the paper, Father,” he said.

Father took the two pieces. One was just like the other. He made one of them into a ball.

“Here, Tom, hold this paper ball,” he said.

Then Father gave the other piece of paper to Jack. He did not make this into a paper ball.

“Now, Jack,” he said, “hold this paper just as far from the floor as Tom holds his paper ball. When I say ‘Go’ each of you must let go of your paper. Are you ready?”

“Yes,” said the boys.

“Go!” said Father.



Both boys let go of the papers. Tom's ball got to the floor first. Jack's paper was slow in falling.

"Well," said Father. "What do you think about that?"

"I think that Tom's ball was heavy," said Jack. "My paper was light. The heavy ball got to the floor first."

"But, Jack," said Father, "the papers were just the same at first."

"That is so," said Jack. "But my paper did not come right down. It was slow. It looked as if something were holding it up."

"Something was holding it up," said Father. "Air was holding it up. The air under your paper was pushing up against it. That made it hard for your paper to fall."

"It was just the same as the wind pushing against me. The wind made it hard for me to get home."

"Did the air under Tom's ball push against it?" asked Jack.

"Yes, it did," said Father. "But your paper was larger and took up more room than the ball. There was a lot of air under it pushing against it."

“Tom’s ball did not take up so much room, so there was not so much air under it to push. That is why Tom’s ball got to the floor first.

“So you see that still air does push, but still air does not push so hard as air that is moving.”

SOMETHING TO THINK ABOUT

What keeps this man from falling fast through the air ?

93



The Siphon

One day Father asked Tom and Jack to help him clean the aquarium.

"We must take out this water and put in fresh water," said Father.

"I'll get the pail," said Tom.

"I'll get a cup," said Jack.

"Get the pail, but we do not need a cup," said Father.

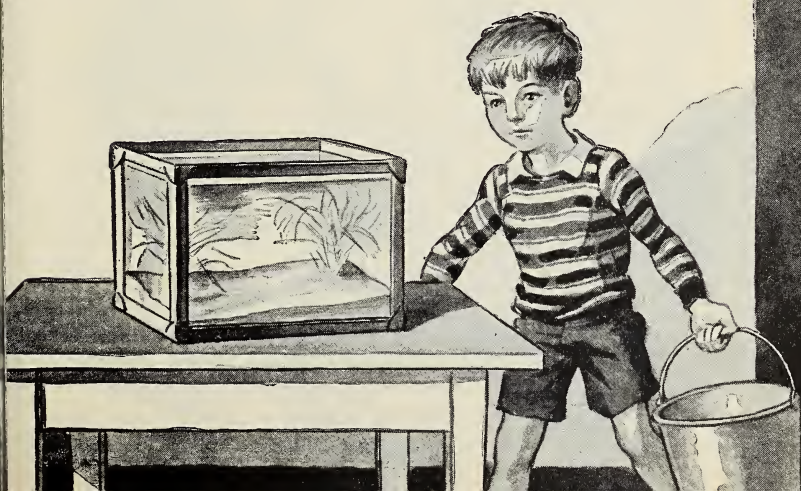


“ Why don’t we need a cup ? ” asked Jack.

“ Mother takes out the water with a cup,” said Tom.

“ I can show you a way that is not so slow,” said Father. “ We can siphon the water out. Put the pail on the floor near the aquarium. I’ll get the siphon.”

Father went out of the room. Very soon he came back with a piece of small rubber hose.



“Now, Jack, put some water in one end of the hose,” Father said. “I’ll hold both ends of the hose up so that the water can not get out. If I hold the hose over the pail, we shall not get any water on the floor.”

Jack put water in the hose. Soon the hose was full of water.

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“I’ll hold both ends of the hose tight now,” said Father. “That will keep the hose full of water. We do not want any air in the hose. The water will keep out the air.”

Father held both ends of the hose. He put one end into the water in the aquarium and the other end into the pail.

“Shall I hold the pail ? ” asked Jack.

“ No,” said Father, “ the pail must be lower than the water in the aquarium. The floor is a good place for it.”

Jack put the pail on the floor.

“ All ready ! ” said Father. “ Now I shall let go of the ends of the hose.”

“ Look ! ” said Tom. “ The water is going out of the aquarium. It is going into the pail.”

In no time most of the water was out of the aquarium and in the pail.

“ That is enough,” said Father. “ I do not need to take out all the water.”

He took the end of the hose out of the aquarium. Now the water was not going into the pail. The siphon was not working.

“ If you want the siphon to work again,” Father said, “ you must put more water in the hose.”



"That was a better way to take the water out of the aquarium," said Tom.

"It was a fast way," said Jack.

"We had help, you see," said Father.

"Yes, Jack helped, and so did I," said Tom.

"You helped to get things ready," said Father. "When we had things ready, something helped us."

"What was it?" asked the boys.

"Something we were talking about the other day," said Father. "It was the air around us."

"Air?" said the boys in surprise.

"How does the air help?" asked Jack.

"Well," said Father, "the air is pushing down on the water in the aquarium. It pushes the water up in the hose to take the place of the water that is falling down into the pail. That is how the water from the aquarium gets into the pail."

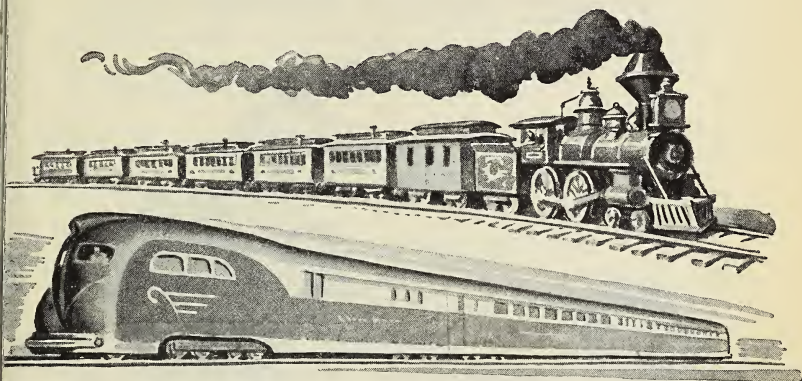
"I like to use a siphon," said Tom.

"So do I," said Jack.

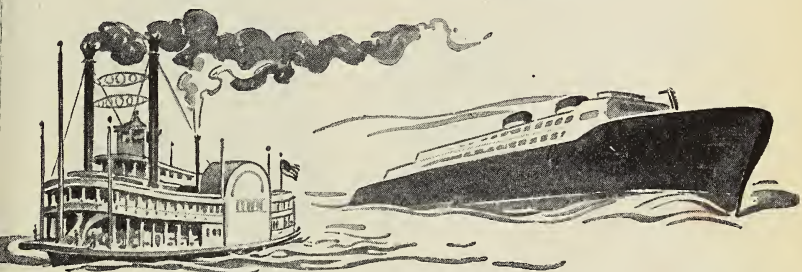
"Well," said Father, "I see that Mother and I shall not have to clean the aquarium again. You boys may do it with a siphon."

THINGS TO THINK ABOUT

Which can go faster ? Why ?

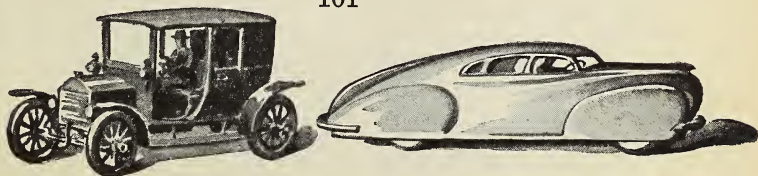


Which goes faster ? Why ?



Which goes faster ? Why ?

101



IV

What Makes Things Go



Making Boats Go

All the children in Miss White's room were working hard. They were making boats.

"If we only had some water in school," said Joe, "I could try my boat."

"You may have some water," said Miss White.

"But I need a lot of water, like a lake," said Joe.

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“You may take the sand out of the sand box,” said Miss White. “Then you may put water into it.”

“Oh, good!” said Joe. “That will be as good as a lake.”

All the children helped to put water into the sand box. Soon the lake was ready for the boats.

Joe put his boat into the water.
It was a sail boat.

"I'll make the wind," he said.

He blew on the sail.

Whoo, whoo, whoo went the wind.
It pushed against the sail. The boat
moved.

When the wind blew, the sail boat
moved. When the wind stopped, the
sail boat stopped.

Wind made Joe's boat go.

105





Mary's boat was ready now.

"My boat isn't a sail boat," said Mary. "I could not make a sail. I am going to push my boat in the water."

She pushed her boat around in the water. Mary made her boat go. She had to push it to make it go.

"Mary, how should you like to have a paddle wheel for your boat?" asked Miss White.



“A paddle wheel!” said all the children.

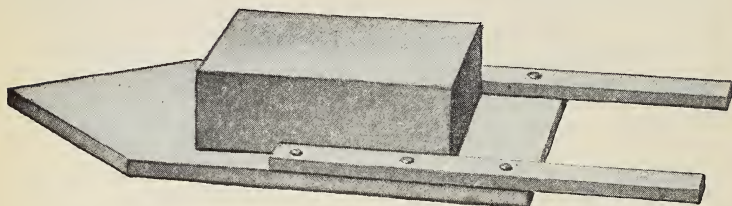
“Yes,” said Miss White. “Some boats have paddle wheels. When the paddle turns, it pushes the water.

“That makes the boat move. It does not need wind to make it go. The paddle makes the boat go.”

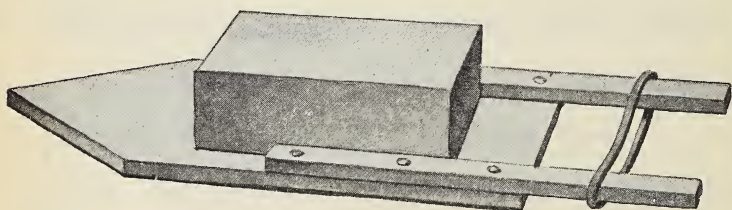
“How can we make the paddle wheel turn?” asked Jack.

“I shall use a rubber band to make the paddle on Mary’s boat go,” said Miss White.

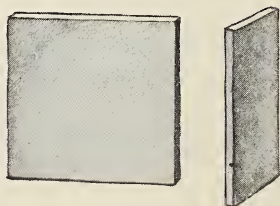
Miss White put a paddle wheel on Mary's boat. She put two pieces of wood on the boat like this :



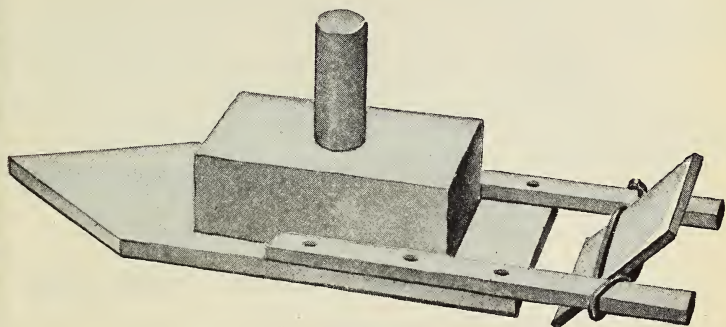
Then she put a rubber band around the two sticks of wood like this :



Then she made a paddle like this :



She put the paddle inside the rubber band like this :

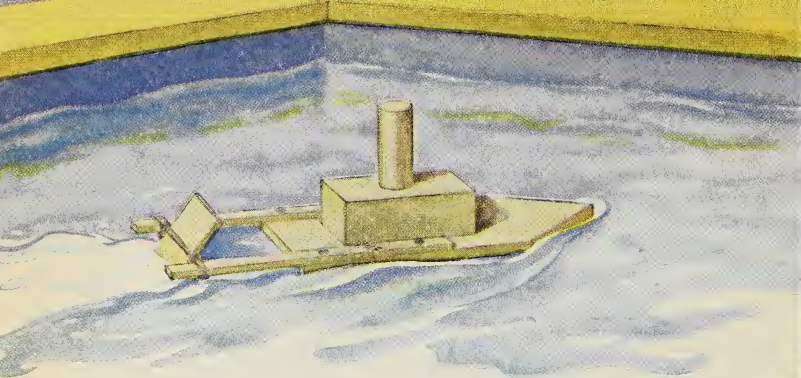


Then she turned the paddle back. She turned and turned it.

“I must not let go of the paddle,” said Miss White.

Then the rubber band got very tight around the paddle. It was hard to turn. Miss White did not let go.

She put Mary’s boat into the water. Then she let go of the paddle. At once the rubber band made the paddle turn.



Splash, splash, splash went the water. The boat moved.

"See it go!" cried the children.
"See it go!"

My, but it went fast!

"Let me make it go," said Jack.

"Let me make it go," said Tom.

"You may each have a turn," said Mary.

The next day Tom and Jack made boats with paddle wheels.

"The name of my boat is *Eagle*," said Jack. "Eagles can go very fast."

"My boat is *Speed King*," said Tom.
"It can go very fast. My boat can go faster than yours, Jack."

"Let's have a race," said Jack.
"Then we shall see which boat has more speed. Who will say *Go* for us?"

"I will," said Mary. "Are you ready?"

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"Yes," said the boys.

They turned the paddles.

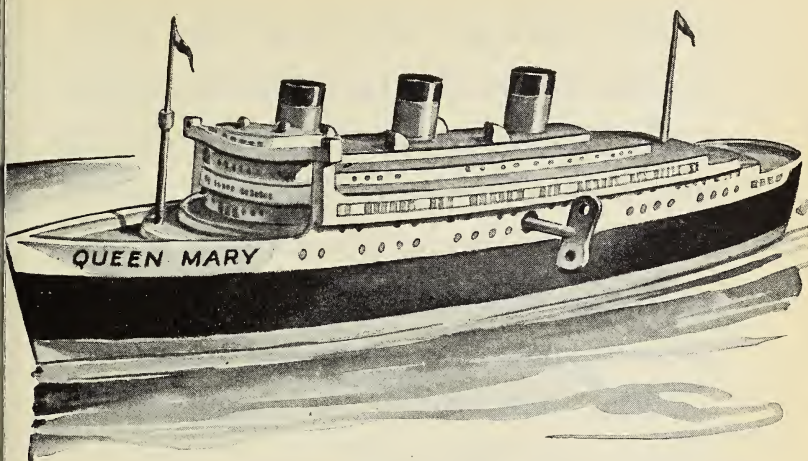
"One, two, three, *Go!*" said Mary.

Away went the boats. Splash, splash, splash went the paddles.

"Go faster, faster, faster!" cried the children.

Very soon one of the boats got to the other side of the lake. The race was over. Which boat do you think won the race? *Speed King* won.

"*Speed King* is a very fast boat," said Jack. "It can go faster than the *Eagle*. I think I know why. My paddle wheel and rubber band are just like Tom's, but my boat is not the same. My boat is larger and it is heavy. It is not so easy for the rubber band and the paddle to move my boat. *Speed King* is a good name for Tom's boat."



A Spring Makes Things Go

"I have a new boat," said Alice.
"I did not make it. Mother got it
for me at the store."

"Does it go?" asked the children.

"Yes," said Alice. "It has a key.
I turn and turn the key until I can't
turn it any more. Then I put the
boat in the water, and something inside
makes the boat go."

"It must go fast, too," said Jack.
"I see it has the name *Queen Mary*.
Let's have a race to see if it can go
faster than the *Speed King*."

Tom turned the paddle on his boat
until the rubber band got very tight.
Alice turned the key on her boat.

"Are you ready?" asked Mary.
"One, two, three, Go!"

Splash, splash, splash went the
Speed King. Zzzzz, Zzzz, Zzzz went
the *Queen Mary*.

"Go faster, faster, faster," cried
the children.

The race was soon over. Which boat
do you think won the race?

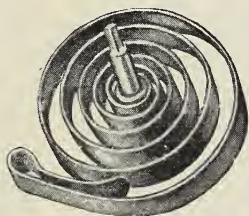
The *Queen Mary* won. It had more
speed than the *Speed King*.

"What is it that makes the *Queen
Mary* go?" asked Jack.

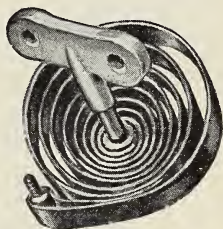
"I'll show you," said Miss White. "There is a spring in the boat. When you turn the key, it makes the spring tight. When you let go of the key, the spring lets go. That makes the boat go."

"Then the spring works like the rubber band," said Jack.

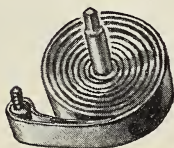
"Yes," said Miss White. "They both make things go. People use springs to make many things go."



This spring
can't make
things go.



The key makes
the spring
tight.

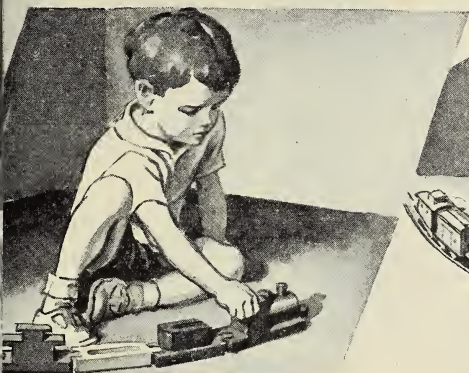


Now the spring is ready
to make something go.



A spring makes these things go.

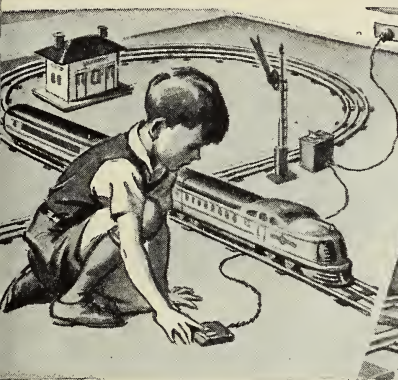
Things Are Moved in Many Ways



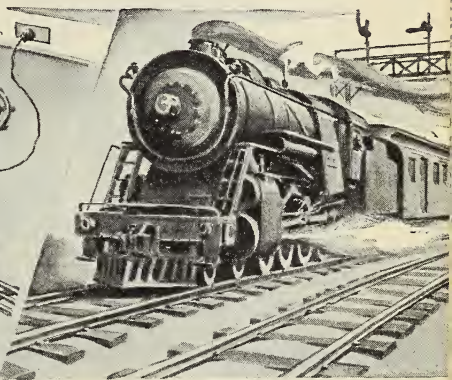
A boy makes this train go.



A spring makes this train go.



Electricity makes this
train go.



What makes this train
go?



What makes these things go?

THINGS TO DO

1. When you are taking a walk, look at moving things and see if you can tell what moves them.

2. If a play thing will not work, find the spring. See if you can make it go again.

3. Look around the house and see how many things are made to go by electricity.

V

Heat and Cold



Winter Days

A Cold Day

One cold day Tom said to Jack, "Let's ask Mother if we may go out to play."

"Yes," said Mother, "it is a good day to play out of doors, but it is much colder. You must put on your snow suits and your mittens."



The boys went to find their snow suits.

"How does Mother always know when it is cold? She has not been out of doors today," said Tom.

"I don't know," said Jack, "but she is always right about it. Let's ask her."

The boys ran to their mother.

"Have you been out of doors today, Mother?" asked Jack.

"No," said Mother, "not today."

"Then how do you know that it is colder?" asked Tom. "You always know when it is cold."

"I can find out in two ways that it is getting colder," said Mother. "When I shut your window this morning, the wind blew hard from the north. A wind from the north is always colder. It made me much colder this morning."

"Then I looked at the thermometer. It is out of doors near the window. I can see it from inside this room. It tells me just how cold or how warm it is."

"How does it tell you?" asked both boys at once.

"Look at the thermometer," said Mother. "Do you see the red line that runs up it?"

"Yes," said the boys. "We see it."

"When it is cold, that line goes down. When it is warmer, the line goes up," said Mother.

"I should like to see the line move," said Jack. "Will it have to get warmer to make the line move?"

"I can make it move," said Mother.

She put up the window and took in the thermometer.

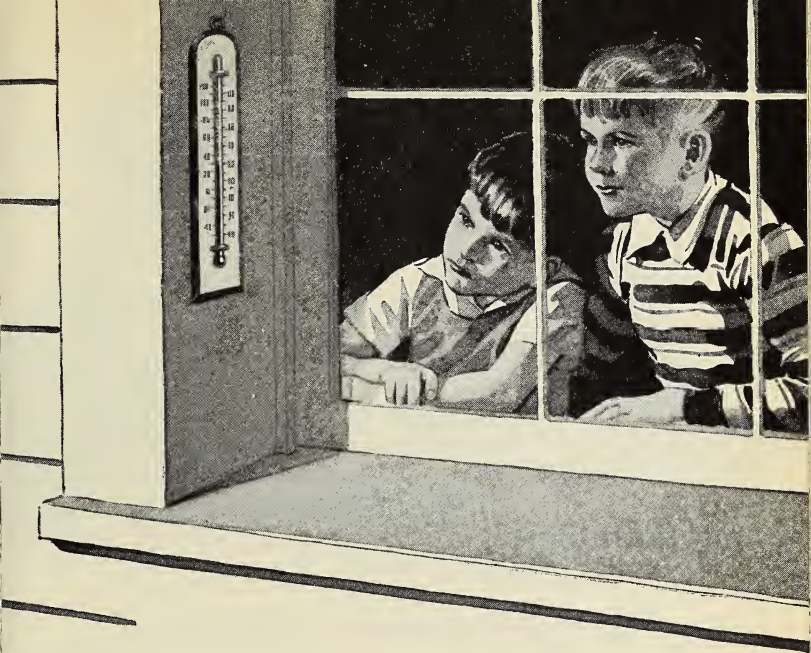


At once the little red line in the thermometer began to go up.

"Look, Jack, look!" cried Tom.
"It is going up! It is going up!"

The line went up and up until it got to 68.

"That tells how warm our room is," said Mother. "It is not too warm, and it is not too cold. It is just right."



Mother put the thermometer out of doors again.

“Look,” said Jack, “the line is going lower.”

The line went down to 30. There it stopped.

“When it goes down to 30, I know that it is cold,” said Mother.

Using the Thermometer

The next day Mother went to the store. When she came home, she had two little boxes.

"Here is a surprise for you, Jack," she said. "And here is one for you, Tom."

"What can it be?" said Jack.

The boys took the paper off the two little boxes.

"A thermometer!" cried Jack.

"A thermometer just for me!" said Tom. "Now I can find out how cold or how warm it is."

"Oh, thank you very, very much, Mother," said Jack.

"I thank you, too," said Tom.

"I am going to put my thermometer out of doors," said Jack.

"So am I," said Tom.



Mother said: "I will take my thermometer into the house. Then Tom can put his in its place."

Tom put up his thermometer.

"Now, where shall we put Jack's?" he asked.

"Let's put a nail over here near this window for Jack's," said Mother.

"Then Jack can see it from inside."

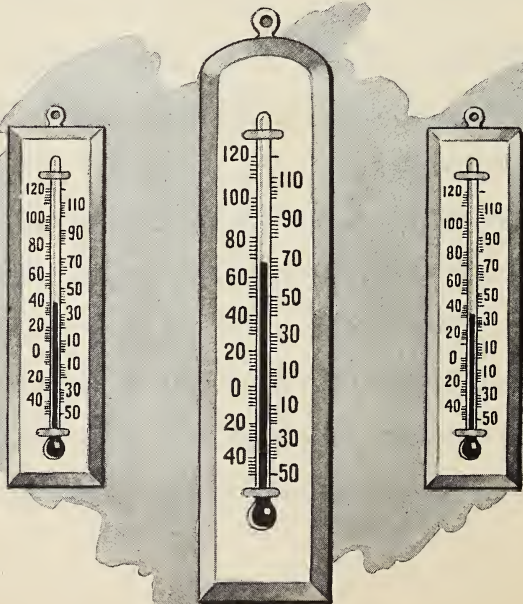
As soon as the boys were up the next morning they looked at all the thermometers. First they looked at Mother's thermometer. It was inside the house, and it said 68.

"That is right," said Jack. "Mother said that 68 is right for our house."

Tom called out, "My thermometer says 40."

Jack said, "My thermometer says 32."

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“That is funny,” said Tom. “Our thermometers are both out in the cold. Why don’t they say the same thing? One of them isn’t any good.”

“The thermometers are all right, boys,” said Mother. “Don’t you know why one says 40 and the other 32?”

“No,” said the boys.

Then Mother said: “It is morning. Tom’s thermometer is on the east side of the house. Jack’s is on the west side. Does that help you?”



“ Oh, I know, I know now ! ” said Jack. “ My thermometer is not in the sun, and Tom’s is.”

“ Oh, yes,” said Tom. “ We see the sun in the east each morning. It makes the east side of the house warmer. That is why my thermometer says 40 and Jack’s says 32.”

“ The sun will be on the west side after lunch,” said Jack. “ Will it be warmer on the west side then ? ”

“That is something for you to find out,” said Mother.

What fun the boys had with their thermometers ! They looked every day to see how cold or how warm it was.

They watched the thermometer in the house, too. When the line went lower than 68, they let Mother know. Then she could make the house warmer.

When it went higher than 70, they let her know about it, too.

When spring days came, the lines on the thermometers out of doors went higher than they did in winter.

“When summer comes, the line will go much higher,” said Jack. “I wish it would go up to 100 some day.”

“Oh, my ! I don’t,” said Mother. “That would be much too warm.”

THINGS TO DO

1. Put a thermometer out of doors where the sun will not shine on it. Do not move it. Look at it in the morning. Look at it after lunch. What have you found out ?

2. Find the coldest room in your house. Find the warmest room. What does the thermometer say in the coldest room ? in the warmest room ?

3. Look at the thermometer at the same time every day for a week. Each day put down on paper what the thermometer says.

Which day was the warmest ?

Which day was the coldest ?

4. Watch the thermometer in your house. What should you do if it said 64 ?

The Snow Man

The snow had been falling all day and all night. Tom and Jack looked out of the window.

"Look at all the snow," said Tom. "There is snow on the houses and snow on the trees. It is all over the ground too. Let's make a snow man."

"That will be fun," said Jack, as he put on his snow suit.

Jack made a snowball. He put the snowball on the ground in the snow. Then he pushed it over and over. Every time the ball went over, there was more snow on it. This made it larger.

The snowball got larger and larger. By and by it was large and very heavy. It was so big that Tom had to help Jack push it.



Then Jack said : “ This snowball is large enough. Now we need to make a head and some arms.”

“ I’ll make the head,” said Tom.

He made a small snowball. He pushed it over and over. Soon it was large enough for a head.

“ Come and help me,” said Tom.
“ This snow head is not large, but it is heavy. I can’t lift it up.”



It took both boys to put the head on the top of the large ball.

They put a snow arm on each side of the snow man.

“Now let’s make eyes and nose and mouth,” said Tom.

They found a piece of red cloth for the mouth. They found two pieces of coal for eyes. Tom made a little snowball for a nose.

“What a good snow man!” said Jack. “It was fun to make it. I like to play in the snow.”

“So do I,” said Tom. “But look, my mittens are all wet.”

“My mittens are wet, too,” said Jack. “Our warm hands melt the snow. That makes our mittens wet. Now my hands are getting cold. Let’s go into the house to get warm.”

The boys ran into the house.

“Put your snow suits where they will get dry,” said Mother. “Your mittens are very wet, too. Put them where it is warm.”

“Did you see our funny snow man?” asked Jack.

“Yes, I saw you making it,” said Mother. “It is a good snow man.”



The Wind and the Sun

It was a very cold night. The north wind was blowing hard. When Jack and Tom were going to bed they looked out at the snow man.

“Do you think the wind will blow it down?” asked Tom.

"I don't know," said Jack. "It may blow the head off. Wind is sometimes very strong."

The boys went to sleep at once.

Whoo ! Whoo ! The north wind blew and blew all night long. It pushed and pushed against the snow man.

When the boys waked up, it was morning. They could see the sun. Jack and Tom jumped out of bed and ran to the window. There was the snow man.

Jack said : "The wind did not blow our snow man down."

"The wind could not blow it down," said Tom. "I think our snow man is too strong for that."

When the boys came home from school, they ran to see the snow man.

What do you think had happened ?



The snow man had no nose. Tom found it in the snow.

“Who did it?” asked Jack. “Who came here and took off the nose?”

“I should like to know,” said Tom.

“So should I,” said Jack.

“Oh, look, look, look,” cried Tom.

Just then down fell a coal eye. Then the boys found out what had happened.

Jack laughed. "It is the sun," he said. "It is so warm today that the sun melts the snow. That makes the nose and eyes fall off."

"The sun is doing something that the wind could not do," said Tom.

Jack made a new nose for the snow man. Tom put in the eyes again.

The next day, off came the nose. Out came the eyes.

"Do not put them back again," said Jack. "It is no use. The sun is too warm. It melts the snow, and they will fall out again."

"Our snow man is getting smaller, too," said Tom.

There were many days when the sun was warm. Every day the snow man got smaller and smaller. By and by it did not look like a snow man at all.



One morning Jack and Tom looked out of the window. There was no snow man! All they could see was a wet place in the grass, two pieces of coal, and a piece of red cloth.

"Well, that is the end of the snow man," said Tom.

"No," said Mother. "The snow man turned into water. Do you know where the water went?"

"Yes," said Tom. "It went into the ground."

“Some of the water went into the ground,” said Mother. “Some of the water evaporated. That is the same as saying that it went into the air. It may come back again in rain. Oh, no ! This is not the end of the snow man.”

THINGS TO DO

1. Bring a pan full of snow into the house. What happens to the snow ?

The next day put it out of doors again. What happens ?

2. Make two large snow balls. Make one just as large as the other. Put one where it does not get much sun. Put the other where it gets much sun. Which one keeps longer ?



Summer Days

What Happens to Water

All the morning the rain had come down.

"I wish it would stop," said Mary. "I don't want to stay in all day. There are so many things to do out of doors. It is no fun to play in the house in summer."

Still the rain came down. Mary helped her mother. Then she cut out paper dolls. Just before lunch she looked out of the window.

“ Oh, Mother,” she said, “ the rain has stopped ! May I go out of doors to play after lunch ? ”

“ You may go out when the walk is dry,” said Mother.

After lunch Mary looked out of the window again.

The walk was still wet. Mary went and played with her dolls.

By and by she came to her mother again. She said, “ Mother, may I go out and play now ? ”

“ Go and see if the walk is dry,” said Mother.

Mary ran to look out of the window. The walk was dry.



“The walk is dry, Mother,” she said. “It’s funny. It was wet before, and now it is dry. Where did the water go?”

“Some of it ran off into the ground,” said Mother. “Some of it evaporated.”

“Evaporated! Oh, what is that, Mother?” asked Mary.

“Evaporated is like saying that the water went into the air,” said her mother.

“It went into the air!” said Mary in surprise. “If I put some water out of doors will it go into the air?”

“Yes,” said Mother. “But it will evaporate in the house too.”

“I should like to try to evaporate some water,” said Mary.

“Very well,” said Mother. “Here is a bowl that you may use. Fill it with water and put it on the table.”

Mary put the bowl of water on the table near the window. Then she sat down near the table.

“What are you doing, Mary?” asked Mother.

“I am watching to see the water go into the air,” said Mary.



Mother laughed and said : “ You will not see water evaporate if you watch all day. Run out and play now. Look at the water in the bowl when you get up in the morning.”

The next morning Mary looked at the bowl of water on the table.

What a surprise ! There was not so much water in the bowl as there had been the day before.

The next day Mary looked again. There was just a little water in the bowl.

The next day Mary looked at the bowl. What do you think had happened ?

" See, Mother ! " said Mary. " There isn't any water in the bowl now. It has evaporated. I should like to try it again."

" Very well," said Mother. " This time I think it will be more fun if we have two bowls of water."

" Why do you think it will be more fun to have two bowls ? " asked Mary.

" You will see," said Mother.

Mary helped her mother to find two bowls. One was just as large as the other. Then they put water in both bowls. They put just as much water in one bowl as they did in the other.



Then Mother said : " I will put one bowl on the table near the window. You may put the other one in the warmest place you can find. Let it stay there until morning. Then we will look at the bowls and see what happens."

The next morning Mary went to look at the two bowls. Then she called :
" Mother ! Mother ! come here, come here. The water in my bowl is all gone. Only a little of yours is gone ! "

Mother came in.

" Well, Mary, did you find out something new ? " she asked.

" The water in my bowl evaporated faster than yours," said Mary.

" Yes, but do you know why it did ? " asked Mother.

" No," said Mary. " Please tell me."

" Your water had a better place to evaporate," said Mother. " You had a warmer place for your bowl than I did. Heat makes water evaporate faster. That is why your water is gone."

" Then I am going to put your bowl of water in a warm place, too," said Mary.



“Very well,” said Mother. “Now run and wash for lunch.”

Soon Mary called, “Mother, I know something more.”

“What is it?” asked Mother.

“When I washed this morning, my wash cloth was wet,” said Mary. “Now it is dry. I know where the water went. It went into the air.”

“Yes,” said Mother, “it evaporated.”

THINGS TO DO

1. Take two pans. One must be just as large as the other. Put just as much water in one as you do in the other.

Put one pan in the sun. Put the other pan in a place where no sun can get to it. What happens ?

2. Fill a cup with water. Put a cup of water in a large pan. Will the water in the cup evaporate as fast as the water in the pan ?

3. On a very cold day fill a pan with water and put it out of doors. Does the water evaporate ? What happens to it ?



The Sun and Shadows

One day when the sun was bright Miss White said, "A bright day is just the kind of day to make shadow pictures."

"What are shadow pictures?" asked the children.

"You will see," said Miss White. "First we put up a sheet like this."

The light from the sun was coming in at the east windows. The sheet was in the sunlight.

“Now,” said Miss White, “we are ready. Who wants to make the first shadow picture?”

The children looked at each other. Then Mary said, “I should like to make a picture, but I don’t know how to do it.”

Miss White said: “Go behind the sheet, Mary. Stay in the sunlight near the sheet.”

Mary went behind the sheet. The children could not see her. But they could see her shadow on the sheet. Every time Mary moved, her shadow moved.

It looked very funny. The children laughed and laughed.



Mary went hop, hop, hop. The shadow went hop, hop, hop, too. The children laughed again.

"I should like to make pictures," said all the children at once.

"Let's take turns," said Miss White.

Peter went behind the sheet. He danced in a funny way. His shadow danced too. Up and down went Peter's arms. Up and down went the arms of Peter's shadow.



Jack played a joke. When he went behind the sheet, he put on Jean's coat and hat. He danced from one side of the room to the other. The shadow danced from one end of the sheet to the other.

The children saw the shadow of Jean's coat and hat. They thought it was Jean's shadow behind the sheet.



The most fun of all was when Jean put on Miss White's hat. What a funny picture to see the shadow of Miss White's hat on Jean's shadow !

The children laughed and laughed.

"Now that you know how to make shadow pictures," said Miss White, "can you tell what makes the shadows ?"

“ I think I can tell,” said Jack. “ We are in the sunlight when we are behind the sheet. The sunlight can’t shine through us. That makes the shadow. Sunlight makes shadows of people and of things.”

“ Do you know something the sunlight can shine through ? ” asked Miss White. “ We could not have played shadows today if the sunlight had not come into our room.”

“ I know ! ” said Mary. “ It shines through the window glass.”

“ Yes,” said Miss White. “ That is one reason why houses have windows. We want the sunlight to come into our houses. Sunlight is good for us. It helps us to live.”

“ May we play shadows again ? ” asked Mary.

“ Yes,” said Miss White, “ you may.”

But the next day the boys and girls in Miss White’s room did not make shadow pictures.

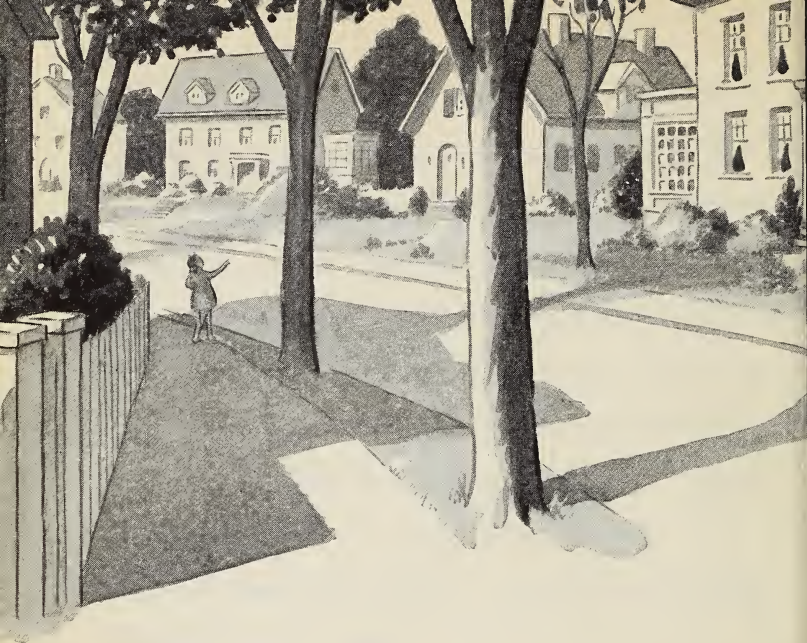
Do you know why ? There was no sunlight coming in at the windows.

“ We can’t play shadows today,” said Mary. “ The sun isn’t shining.”

“ The sun is shining today, Mary,” said Miss White. “ But you can not see it. Some big, dark clouds are in front of the sun. That is why there is no sunlight coming in at the windows.

“ It is colder today, too,” said Jack. “ Sunlight keeps things warm. The clouds keep the sunlight from shining on things today.”

“ What do we do to keep cool on the days when there is bright sunlight ? ” asked Miss White.



“We stay in the shade,” said Tom.
“And that is the same as saying that we stay in the shadow of something.”

“That is right,” said Miss White.
“Houses and trees and other things make shadows the same as we did. In winter I walk in the sun to keep warm. In summer I walk in the shade to keep cool.”

THINGS TO THINK ABOUT

1. What makes a cellar cool in the summer ?
2. What makes your shadow so long in the morning ?
3. Is your shadow as long at lunch time?
4. Is your shadow longer or not so long after school ?

SOMETHING TO DO

Put a nail in the sunlight in the morning.

Put another nail in the shade.

Go back after lunch and put your hand on each nail.

What do you find out ?

VI

Working with Machines and Magnets



Moving the House

The children had made a playhouse in the yard at school. They liked the playhouse. It was a pretty little house.

It was fun to make it. It was fun to play in it.

Then spring came.

"Let us make a garden," said the children.



“The only good place for a garden is where the playhouse is,” said Miss White. “The other places are in the shade.”

“I wish the playhouse had wheels on it,” said Alice. “Then we could move it like a wagon.”

“Let’s put wheels under it,” said Tom.

“How funny ! ” said Mary.

“Once I saw some people moving a house,” said Tom. “I watched them, and I think I know how to do it.”

The next day Tom and Jack came to school with some long broomsticks.

“What are the broomsticks for ? ” asked Alice.

“You will see,” said Tom. “Will you and Jack lift one end of the playhouse for me ? ”



Alice and Jack tried to lift the playhouse. They tried and tried, but they could not do it. It was too heavy for them.

More children came and helped, but they could not lift the house. It was too heavy.

“ I know how we can lift the end of the playhouse,” said Tom. “ Once I saw Father lift a heavy stone with a crowbar. It was easy.”

“ What is a crowbar ? ” asked Alice.

“ It looks like a long stick, but it is made of iron,” said Tom. “ We have no crowbar. But we can use one of the broomsticks for a crowbar.”

Tom put one end of the broomstick under the playhouse. Then he put a stone under the stick.

He pushed down on the very end of the broomstick, and up came the playhouse.

“ Oh ! ” said the children.

“ How strong you are ! ” said Alice.

“ No,” said Tom. “ You are as strong as I am. The stick and the stone helped me.”

"It looks easy to do," said Alice. "And it looks like fun. Please let me try."

Alice tried, but she could not lift the house.

"Oh, my!" said Alice. "I am not strong enough to do it."

"Yes, you are strong enough," said Tom. "You did not do it right. You did not push on the end of the stick. You must push down on the very end of the crowbar."

Alice tried again. This time she pushed on the very end of the stick. Up came the house!

"Isn't that funny!" said Alice. "I push down on the stick, and the house goes up."

Miss White came to see what the children were doing.



“That long stick with a stone under it is a lever,” said Miss White. “People use levers to help them to lift heavy things. We use levers in many ways.”

“You know how to lift the house, Alice,” said Tom. “Now you can help me to move it.”

“Let’s all take turns,” said the children.

“All right,” said Tom. “Alice may have the first turn to lift the house with the lever. Jack can help me to put the broomsticks under the house.”

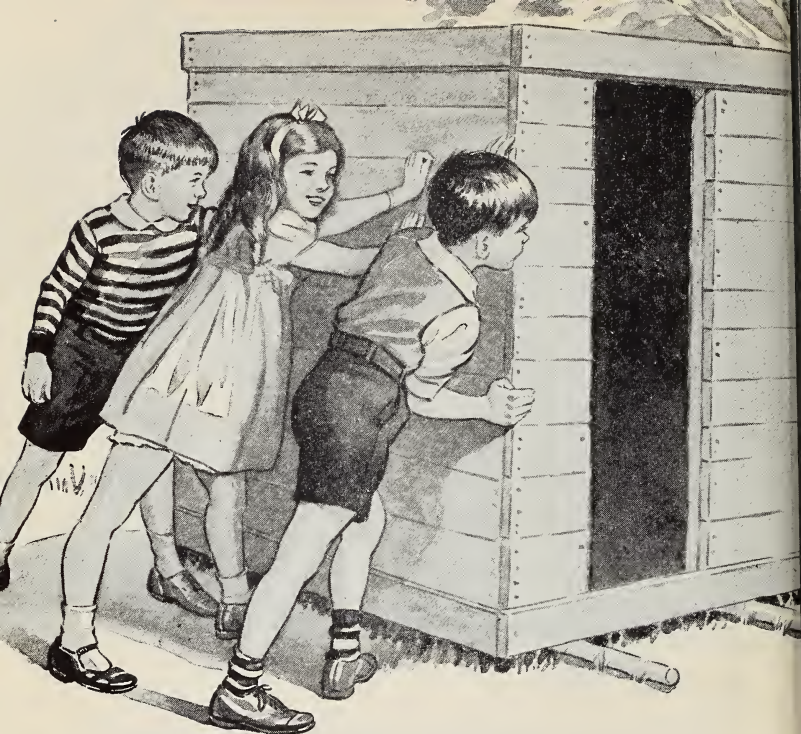
Alice used the lever to lift the house. Then Tom and Jack put the broomsticks under it.

“Now,” said Tom, “with these broomsticks under the house for wheels we can move it.”

All the children pushed the house. It moved on the broomsticks.

Soon a stick moved out at the back. Then Tom and Jack put it under the front of the house.

When the broomstick was under the house again, the children pushed the house a little more.



The house moved a little way again on the broomsticks. As soon as a broomstick moved out at the back, the boys put it under the front of the house.

The children liked moving the house. They moved it all over the yard.

Then Miss White said, "Now you must find a place for the house."

"Where shall we put it?" asked Jack.

"Let's put it under the apple tree," said Mary.

"Yes, that is a good place for it," said Jack.

The children moved the house to the apple tree. They had to take the sticks out from under the house. They used a lever again to lift the house. Soon the house was on the ground.

"I think it is fun to move a house," said Alice.

"So do we," said all the children.

"But," said Tom, "the lever helped us. We could not have moved the house if we had not had the lever."

Using a Gangplank

"ALL ABOARD ! ALL ABOARD !" called the captain.

Jack was the captain. His boat was made of a large box. He and the other boys and girls had made it at school.

The boat was full of boxes. There were big boxes and little boxes.

The children put the boxes on and off the boat. What fun they had !

"All aboard !" called the captain again.

By and by Tom said, "I am going to put something in my box. I will play that it is going to another boy far, far away."

He put many stones into the box. When it was full he took some nails and put a top on it.



Then he tried to put the box on the boat. It was too heavy. He could not lift it.

Jack and Mary and Alice tried to help him. They could not lift the box. It was too heavy.

"I'll help you to do that," said Miss White.

The children thought she would lift the box into the boat. But she did not.

She said, "Tom, see if you can find a long, smooth board."

Tom found a board. It was long and smooth.

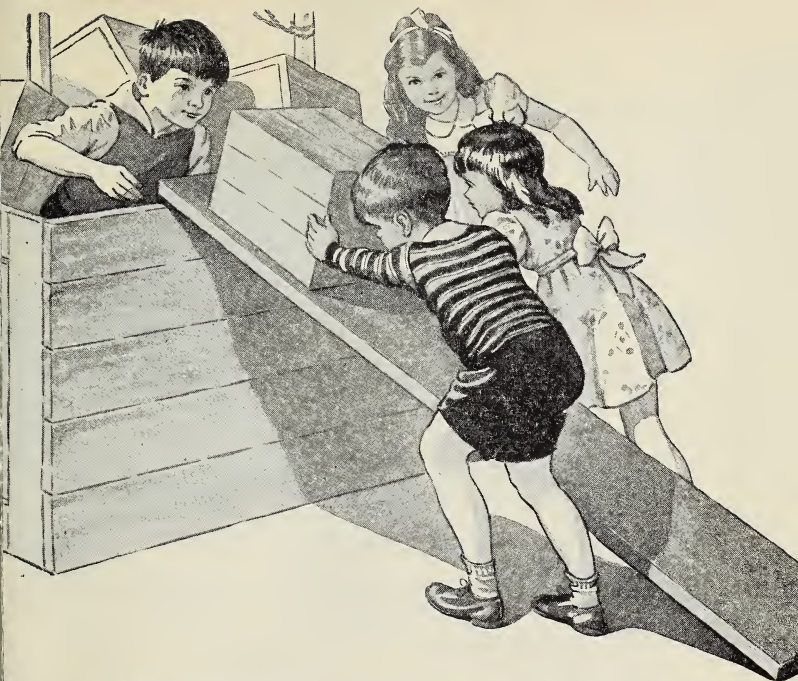
Then Miss White said, "Now, Tom, put one end of the board on the boat. Put the other end on the floor near the box."

Tom put the board in place.

"I know what that is," said Joe. "It is a gangplank. All boats have them. That is how people get on the boat."

All the children wanted to walk up and down the gangplank. Up and down, up and down they went.

Alice said: "It is easy to walk up the gangplank. It is not so easy to get over the side of the boat."



"Miss White, are you going to lift the box into the boat?" asked Tom.

"No," said Miss White, "I shall not need to lift it. You can push the box up the board."

"That will be easy to do," said Tom. "It is too hard to lift it over the side of the boat. Who will help me push the box up the gangplank?"

Some of the children pushed the box up the gangplank. It was easy to push the heavy box on the smooth board.

"The gangplank is a machine," said Miss White.

"How could it be a machine?" asked Jean. "It does not move."

"Things that help us to work are machines," said Miss White. "The gangplank is a machine. It helped us to get the box into the boat."

"Then the broomstick we used to lift the playhouse was a machine," said Jack. "Not one of us could lift the playhouse. When we used the lever, it was easy."

"You are right, Jack," said Miss White. "Your lever was a machine. Machines help us to do things. Our work is not so hard when we use them."



Using another machine.

THINGS TO THINK ABOUT

1. Does your mother use machines in the house ?

2. Does your father use any machines in his work ?

3. When you go for a walk, look for people who are using machines to help them do their work.

4. Can you name some machines that use electricity to make them go ?



The Magnet

Tom and Jack were going to make a playhouse in their yard. They had some boxes, some boards, and some nails. They each had a hammer too.

“May I help you?” asked Mary.

"Where is your hammer?" asked Jack.

"I have no hammer," said Mary.

"Then you may hold the box of nails. That will help Tom and me," said Jack.

Mary was happy. She got boards and boxes too. She got all the things for the boys.

"Please give me some nails, Mary," said Tom.

Mary ran fast with the nail box. She did not look where she was going. She fell over a board.

Down she went! And away went the nails! It looked so funny!

Tom and Jack and Mary laughed.

"Who will help me to pick up the nails?" asked Mary.

"I will," said Tom.

"I'll help, too," said Jack.



"But where are all the nails?" asked Jack. "I can't find all of them."

"Oh, here they are!" called Mary. "They fell down into this hole."

The hole was near the cellar window. It let air and sunlight into the cellar. There were iron bars over the hole.

Mary said, "Let us go down into the cellar and put up the window."

"We can't get into the cellar," said Jack. "Mother is away. We have no key to the cellar door."

The children looked down into the hole.

"I think we can get the nails," said Jack.

Tom and Jack put their arms through the bars. They tried and tried to get the nails.

"We can not get them," said Jack. "Our arms are not long enough."

Then Mary said : "I'll get Billy. His arms are much longer than ours. He will help us."

"Oh, yes," said Jack. "Please go and ask him to come and help us."

Soon Mary came back with Billy.

The children were near the hole.

Billy got down on the ground. He put his arm through the bars. He could not get the nails. His arms were not long enough.

"What shall we do?" asked Mary.

"I know another way to get them," said Billy. He ran off home.

"I'll be back soon," he called.

"Do you know why he is going home?" asked Tom.

"Do you think he is going to get your father?" asked Jack. "His arms are longer than Billy's."

"Father is not at home," said Mary.

By this time Billy was back. He had a long string in his hand. On the end of the string was something bright red. It was heavy. It looked like a little horseshoe.

“ Oh, see the little horseshoe ! ” said Jack. “ What is it ? ”

“ I know what it is,” said Mary. “ It is a magnet. Father gave it to Billy.”

“ What are you going to do ? ” asked Tom.

“ Just watch me use the horseshoe,” said Billy.

Billy went to the hole. He let the magnet down by the string.

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It went down into the hole, right on top of the nails. Then he pulled it up.

"Oh, oh!" cried Tom. "See how the nails stick to the magnet!"

Billy pulled the magnet to the top. There were five nails on it. They held on to the magnet. Billy had to pull to get them off.

"Do it again, Billy! Get some more nails!" said Tom.

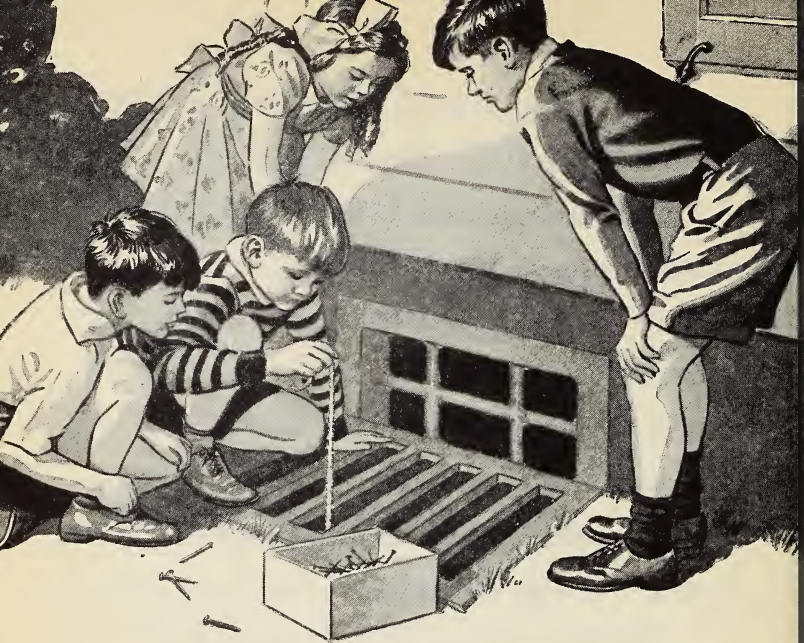
"Please let me do it," said Jack.

"You may have turns," said Billy.

Jack let the magnet down into the hole. Then he pulled it up. This time there were more nails on the magnet.

It was lots of fun. Sometimes the smallest nails jumped to the magnet and held on.

Tom tried to get the largest nail. He held the magnet over it.



It moved and turned over. But it would not hold on to the magnet. Tom could not pull it up.

"My magnet is not strong enough for the largest nail," said Billy.

"Now it is my turn," said Mary. "I see a piece of glass down in the hole. I am going to get it."

Billy laughed and said : “ You may try, but you can’t get it. I know that the magnet will not pick up glass.”

Mary tried and tried.

“ You are right, Billy. I can’t get the glass,” said Mary. “ The magnet picks up nails, but it does not pick up glass ! Are there other things a magnet does not pick up ? ”

“ You may keep my magnet for two or three days,” said Billy. “ Then you can find out what it picks up and what it does not.”

THINGS TO DO

1. Have you a magnet ? Go around the house with it and see how many things the magnet will pick up.

2. Put some nails in a pan of water. Will a magnet pick them up ?

VII

The Garden



Making the Garden

Stones and Worms

The boys wanted to make a garden.

Jack and Tom got their spades and rakes. Then they went to work in the garden.

First they turned the soil over with the spades. They found many stones in the ground. They put all the stones in one place at the back of the garden.

"Stones are not good in a garden," said Jack.

The boys found many worms in the ground, too.

"Jack, what shall we do with the worms?" asked Tom.

"Take them out," said Jack. "We don't want any worms in our garden."

So Tom put the worms in an old can.



By and by Father came to see the garden. He saw the stones too.

"It is good for the garden to take out the stones," said Father.

Then he saw the can of worms.

“ Why did you take the worms out of the earth ? ” he asked.

“ We want a good garden,” said Tom.

“ But these are earthworms,” said Father. “ They are good for a garden.

“ They dig their way around in the earth. They eat some of the earth. All this helps the plants to grow.

“ If you want a good garden, put the worms back.”

So Tom and Jack put the worms back into the garden. At once the worms went into the ground again.

“ I did not know that a worm could be good for a garden,” said Tom.

“ Are all worms good for gardens ? ” asked Jack.

“ No,” said Father. “ Not all worms are good for gardens, but earthworms are good for all gardens.”

What Shall We Plant?

Jack and Tom worked hard in their garden. They turned the earth with their spades. Then they used their rakes on it.

Now came the most fun of all. It was time to plant the seeds.

"I want to plant vegetable seeds," said Jack.

"I want to plant flower seeds," said Tom.

"I have a book about gardens," said Father. "It tells about many kinds of vegetables. Jack can look at it and find out what vegetables to plant in his garden."

"Does it tell about flowers too?" asked Tom.

"Yes, Tom," said Father, "you can find out about flowers too."



Father got the book. They all looked at it.

"Some flowers and vegetables are easy to grow," said Father. "Some are hard to grow. We must find some that are easy to grow."

They looked at the pictures in the book. Then Jack said: "I want to plant radishes and beans. They are vegetables, and they are easy to grow."



Tom looked at the pictures of flowers in the book.

“I want to plant marigolds and zinnias,” he said. “They are flowers. The pictures of them in the book are very pretty. They are easy to grow, too.”

So Jack planted his vegetables in one end of their garden. Tom planted his flowers in the other end.

They planted the seeds in rows. They put a little earth over the seeds. They were very careful to push the earth down over them.

At the end of each row the boys put up a stick. On the stick they put the name of the seeds they had planted in that row.

"Now we shall know what we have planted," said Jack.

The boys put away the spades and rakes. The next day they had rain.

"I am glad that we have our seeds planted," said Jack. "The rain will make the earth wet. That will help our seeds."

The next day the sun was shining.

"I am glad to see the sun," said Tom. "The sun is making the earth warm. That will help our seeds to grow."

Every day, rain or shine, Tom and Jack looked at the garden.

One morning they saw a little green thing. It was pushing up through the ground. The next day the green thing was larger.

"That may be a radish plant," said Tom. "It is near the stick that says *Radish*."

The next day they saw more little green things. They were in a row in front of the stick that said *Radish*.

"Oh, look, they are radish plants!" said Tom.

"Yes, they are radishes," said Jack. "Let's tell Father."

Soon the bean plants began to grow.

The zinnias and the marigolds were not up. By and by they began to grow, too.



Tom and Jack had planted the seeds
in rows. So the plants came up in
rows.

There was a row of beans.

There was a row of radishes.

There was a row of zinnias.

There was a row of marigolds.

Weeds

One day the boys found many new little plants in the garden. These plants were not in rows. They were all over the garden.

“What are they?” asked Jack.

“Who planted them?” asked Tom.

Father saw the little plants that were coming up all over the garden.

“These plants are weeds,” he said.

“No one planted them. The seeds have been in the earth all winter. Now that spring is here they are coming up, too.

“If you are to have a good garden, you must pull up the weeds. They take water from the earth. They grow fast, and they leave no room for other plants.”

“Let’s pull out the weeds,” said Jack.



The boys worked hard almost all the morning. There were many weeds to pull.

When the weeds were all out, the boys' garden looked very well.

"I am glad the weeds are all out," said Tom.

"So am I," said Jack.

"Come and see our garden now, Father," said Tom. "The weeds are all out."

"They are all out now," said Father. "But in the morning you will find more weeds. There are many, many seeds of all kinds in the earth. Many of them will grow."

"If you want to have a good garden, boys, you must pull the weeds every day."

"Weeds are not good for a garden," said Tom. "We are not going to have them in our garden. We will weed our garden every day."

Visitors Come to the Garden

Insects

One morning Jack and Tom worked hard in the garden. They pulled the weeds. They put water on their plants.

"Oh, look!" said Tom. He held up a zinnia plant. "This plant was on the ground."

"We must have broken it when we pulled the weeds," said Jack. "We shall have to be more careful."

When Father came out to the garden he saw the broken zinnia plant.

"I know what has happened," he said. "There is a visitor in your garden. The visitor has broken your plant."

"What visitor? What visitor?" asked the boys.



“Take a stick and dig around the plant,” said Father. “I think you will find what did it.”

The boys took sticks. They were very careful. Soon they found a fat white insect. It looked like a ball.

“Is this it, Father?” asked Tom.

“ Yes,” said Father. “ That insect is called a cutworm. That is what cut your zinnia plant.

“ There are cutworms and other insects in your garden that are not good for it. See all the little holes in the leaves. Some insect did that.”

“ What can we do about the worms and insects ? ” asked Jack.

“ Birds eat insects and worms. You can invite birds to your garden,” said Father.

“ That is a joke,” said Jack. “ How can we invite birds ? ”

“ You can put up bird houses,” said Father.

“ I should like to have robins in our garden,” said Tom.

“ Robins do not use bird houses,” said Father.

"We want birds of all kinds in the garden," said Tom.

"If you have a bird bath in your garden, many birds will come to it," said Father.

"Birds must have water to drink. Sometimes it is very hard for them to find water. If you have water in your garden, birds will come to get a drink. They will take a bath too.

"Then they will look in the garden for something to eat. Many birds eat insects. They will find good food in your garden."

"We must have a bird bath," said Tom.

"Is a bird bath hard to make?" asked Jack.

"No," said Father. "It is easy to make. I will help you."

The Bird Bath

Early the next morning Jack asked, "Shall we make the bird bath today, Father?"

"Yes," said Father, "I can help you today. We must have a bowl or a pan. Let us ask Mother for one."

"May we have a bowl or a pan for a bird bath, Mother?" asked Jack.

"Yes," said Mother, "here are some bowls. Take any one you like."

Tom and Jack looked at the bowls.

"This bowl is too small for a bird bath," said Tom.

"I think this one is too deep," said Jack.

"This bowl is just right," said Father. "It is large but not deep. Birds will not use a deep bath."

They took the bowl out to the garden.



“Where shall we put it?” asked Tom.

“The birds need a good place to dry off after a bath,” said Father. “When birds are wet, it is hard for them to fly.”

"Let's put it near the little apple tree," said Tom. "They can sit in that tree to dry off."

"Yes, that is a good place for a bird bath," said Father. "Now, boys, dig a hole. Make it as large and as deep as the bowl. Put the bowl in the hole."

When the hole was ready, Tom put some pretty stones around the bowl.

Jack put some water in it.

"You must put in fresh water every day," said Father.

"Now our bird bath is ready," said Jack.

"It looks like a pretty little lake," said Tom. "I wish the birds would come to it and take a bath."

"We must go away," said Father. "Birds will not come to the water if we are near it."

Birds

“Now let us watch for birds,” said Jack.

“What kind of bird do you think will come to our bird bath first?” asked Tom.

“We must watch and see,” said Jack.

By and by Tom said: “There is a bird in the garden. Do you think it can be a robin?”

“Let’s go and see,” said Jack.

It was a fat robin. He hopped around the bird bath. He looked at the water in the bowl. He took a drink of water. Then he took another and another.

He hopped into the bowl. He went splash, splash, splash in the water. He got very wet. What a good time he had in the bird bath!



After his bath the robin flew up into the little apple tree to get dry. Then he began to hop around in the garden. By and by he flew away.

“Look, he has something in his mouth!” said Jack.

“It is a cutworm,” said Tom.
“Good! I wish he would come back for more.”

Soon there were two robins in the garden. They hopped about and looked for insects. They did not eat the insects when they found them. They flew away with them.

After a time they came back to the garden again. They did this many, many times.

"I think they are a mother robin and a father robin," said Tom.

"Then they must be taking food to their baby birds," said Jack.

"I should like to see the baby robins," said Tom. "I wish we could find their nest."

"I think we can find it," said Jack. "Let's watch and see where they go."

The boys sat very still and watched the robins. Time after time the birds flew away with insects.



“ I think the nest is in the big apple tree,” said Jack. “ Robins like to live near people.”

By and by Jack and Tom found the robin’s nest. It was in the apple tree. There were three fat baby birds in the nest.

“ Now I see why the father robin and the mother robin are working so hard to find food,” said Tom.

Soon more and more birds found the bird bath.

“The birds like our bird bath,” said Jack. “They come all the time. They must have nests near the garden.”

At first just the mother and father birds came to the garden.

By and by their baby birds came with them.

It was fun to watch the birds as they hopped about.

They came to get a drink of water.

They came to take a bath.

They came to find insects and worms in the garden.

“It is fun to invite the birds,” said Jack and Tom. “And they are good for our garden.”



A Toad

One morning Tom and Jack were working in the garden. They found a large toad.

It was about the color of the ground. It sat very still. The boys almost did not see it.

“Well, Mr. Toad,” said Jack, “are you good for the garden? If you are, you may stay. If you are not, you must get out.”

“How are we going to find out?” asked Tom.

“We will ask Father,” said Jack.

But Father would not tell them. He said, “We will let Mr. Toad tell you.”

“Is that a joke?” asked Tom.

“No, it is not a joke,” said Father.
“Come out to the garden.”

“There he is,” said Jack. “He is near that large zinnia plant.”

Father said: “Sit very, very still. Watch the toad.”

Tom and Jack sat very still.

By and by the toad’s tongue came out very fast. Back again went the tongue, just as fast.

His tongue went so fast that the boys almost did not see it.

“ Did you see that ? ” asked Father.

“ Yes, I saw his tongue come out,” said Jack.

“ What did it do ? ” asked Tom.

“ Look at the holes in the leaves of the plant near the toad,” said Father.

“ Holes like that are made by little insects. Some insects eat the leaves of plants. If they eat all the leaves, the plant can’t live.

“ Toads eat insects. When the toad put out his tongue, he was after an insect. Now he is watching for another insect.”

“ He is good for the garden ! ” cried Tom and Jack. “ We did not invite him, but we want him to help us. He may stay in our garden.”

Bees and Butterflies

Every morning the boys went to look at the garden. It was never the same. Every day there was something new to see. Every day the plants got larger and larger.

One day Jack said : " Look, Tom, look ! There are a lot of buds on your marigold plants."

" There are some buds on the zinnia plants too," said Tom. " Soon the buds will grow into flowers."

Not many days after that the garden was full of flowers.

Father and Mother came to see how pretty it looked.

" I see you have more insect visitors here," said Father.

" Are you talking about the bees and butterflies ? " asked Jack.

“Yes,” said Father, “I see a bee now. It is going into a flower to get nectar. Nectar is sweet. Bees and butterflies eat it. Let’s watch this bee.”

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The bee went down into the flower for the sweet nectar. Then it came out again. After that it flew to another flower.

"It wants more nectar," said Tom. "We made a garden with flowers for them. Now they can get nectar."

"Yes, that is right," said Father. "But butterflies and bees are good for the garden, too."

"What do they do for the garden?" asked the boys.

"This is what they do," said Father. "There is some yellow dust called pollen in each flower."

"I think I see some dust in this flower," said Jack.

"I saw some pollen just now," said Tom. "That bee had pollen dust on its legs."

"A bee or a butterfly takes pollen with it as it flies from one flower to another," said Father. "The flowers need pollen to make seeds.

"When a bee or a butterfly goes into a flower to get the sweet nectar, some of the pollen sticks to it.

"Then the bee or butterfly flies to another flower. As it goes into this flower some of the pollen stays there and helps to make seeds.

"You see, bees and butterflies are good for your garden."

"I never thought there was so much to know about a garden," said Jack.

"Tom and I made it, so we call it our garden. But it would not be much of a garden if the birds and the toads and the bees and the butterflies did not help us."

SOMETHING TO THINK ABOUT

1. How many kinds of animals have you seen in a garden ?
2. How many of these animals were good for the garden ?
3. How many of these animals were not good for the garden ?

SOMETHING TO DO

Make a book of pictures and stories about flowers or vegetables.

VOCABULARY

The vocabulary of "We Find Out" has been carefully selected in order to hold reading difficulty to a minimum. A list of the assumed words is given in the teachers' manual which accompanies this book.

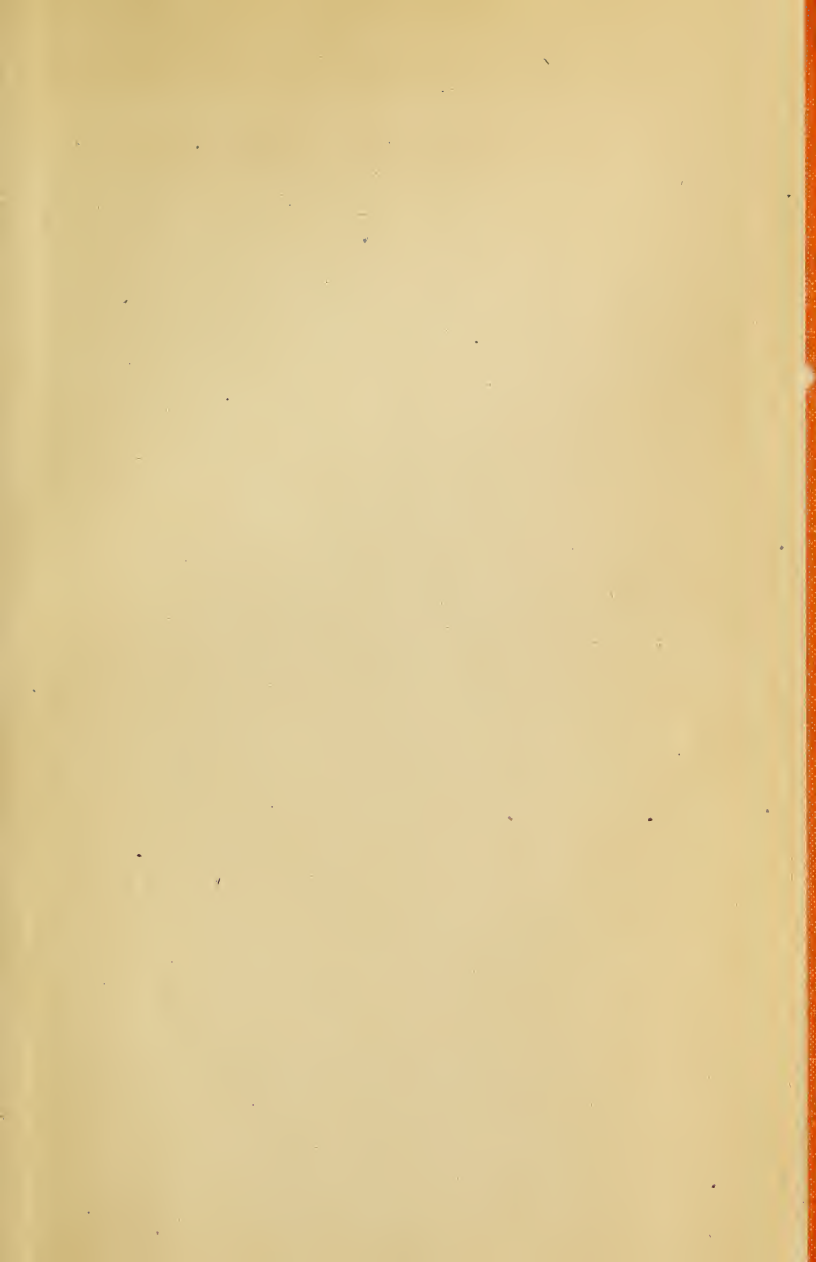
In addition to the assumed words, 297 new words have been gradually introduced. No more than three new words appear for the first time on any one page. Every new word is used a minimum of three times within the book. All variants are counted as new words except those formed by the addition of -s or 's. The following list includes the new words by pages:

New Words by Pages

7. feet	seen	ground
8. larger	smallest	30. blew
large	20. elephant	31. air
small	largest	moving
9. got	22. these	32. flower
10. than	or	bowl
smaller	park	33. drink
any	23. talk	wash
11. kinds	alive	34. stones
12. Alice	room	board
only	24. grow	35. nail
Jack	yard	iron
13. right	25. grass	dig
15. another	can't	36. should
16. most	26. cut	glass
17. Tom	people	smooth
near	garden	37. more
18. fly	27. pieces	washed
insect	sand	colors
flies	28. wind	38. rings
19. ants	never	diamond

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|-------------------------------|--|---------------------------------|
| 39. held
shine
mica | 59. holes | shut |
| 40. used
isn't | 60. watching
swimming | 82. reason
happen
eyes |
| 41. taking
moved | 61. legs | 83. mouth
fresh
faster |
| 43. aquarium
surprise | 62. each
longer
years | 84. enough
burning
better |
| 44. ready
clean
breathe | 63. weeks
been
turned | 85. always |
| 45. buy | 64. sit
both
land | 86. which
goes |
| 46. tadpoles
grew
frog | 69. talking
stories | 87. pushes
blowing
hat |
| 47. snail
once
watch | 70. woodchuck
chipmunk
winter | 88. pushing
against
today |
| 48. Mr. Smith
glad | 71. earthworm
mole
worms | 89. push |
| 49. pail | 72. snake
hop | 90. show
hold
far |
| 50. don't
nose
thinking | 73. above
wild | 91. slow
falling
heavy |
| 51. lungs
gills | 74. sometimes | 92. holding
lot |
| 52. paper
good-by | 75. horses
still | 93. through |
| 53. side | 77. fire
Halloween
jack-o'-lantern | 94. siphon
I'll
cup |
| 54. heat | 78. hide
behind
afraid | 95. rubber
hose |
| 56. hill
jar
spade | 79. ask
candle | 96. end |
| 57. soil
full
top | 80. happened
goblin | 97. tight |
| 58. before
work | 81. well | 98. lower
working |
| | | 99. helped |

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|-------------------|------------------|----------------|
| 103. try | 135. cloth | 182. Billy |
| 105. whoo | coal | 183. string |
| stopped | 136. wet | horseshoe |
| 106. paddle | dry | 185. pulled |
| 107. turns | 137. blow | 189. rakes |
| band | 138. strong | 191. earth |
| 109. inside | 139. fell | 192. worked |
| 110. splash | 140. doing | vegetable |
| cried | 142. evaporated | 193. radishes |
| <i>Eagle</i> | saying | beans |
| 111. <i>Speed</i> | 143. stay | 194. marigolds |
| <i>King</i> | 146. evaporate | zinnias |
| race | fill | planted |
| 112. won | 150. gone | 195. rows |
| 113. spring | 153. shadows | careful |
| key | bright | 196. radish |
| until | sheet | 198. weeds |
| 114. <i>Queen</i> | 154. sunlight | leave |
| 117. electricity | 155. danced | 199. almost |
| 121. colder | 156. joke | 201. visitors |
| suits | thought | broken |
| mittens | 159. shining | 202. fat |
| 122. north | front | 203. cutworm |
| 123. thermometer | cool | invite |
| line | 160. shade | robins |
| warmer | 161. cellar | 204. bath |
| 124. began | 162. machines | 205. deep |
| 126. using | magnets | 208. hopped |
| boxes | 163. playhouse | 209. flew |
| 129. east | 164. broomsticks | 213. toad |
| west | 165. tried | 214. tongue |
| 130. lunch | 166. crowbar | 216. bees |
| 131. watched | 168. lever | butterflies |
| higher | 172. gangplank | buds |
| wish | aboard | 217. nectar |
| 132. coldest | captain | sweet |
| warmest | 179. hammer | 218. dust |
| 134. arms | 180. pick | pollen |
| lift | 181. bars | 219. butterfly |



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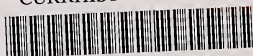
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